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ABSTRACT

Those who study education policy have struggled to understand how money matters in education and why educational research finds no strong or consistent relationship between expenditures and student performance. The papers in this publication were commissioned by the National Center for Education Statistics (NCES) to address the twin concerns of what additional school-finance information NCES should collect and report, and how extant data might be analyzed. The publication is dedicated to Charles S. Benson, University of California, Berkeley, who dedicated his life's work to improving education finance for students in poor school districts. Following the foreword by Paul D. Planchon, and acknowledgments, contents include the following papers: (1) "Introduction and Overview" (William J. Fowler, Jr.); (2) "Does Money Matter in Education? A Policymaker's Guide" (Lawrence O. Picus); (3) "The Effect of Constitutional Litigation on Educational Finance: A Further Analysis" (G. Alan Hickrod); (4) "Student-Level School Resource Measures" (Robert Berne and Leanna Stiefel); (5) "Proposed 'Good Practices' for Creating Data Bases from the F-33 and CCD for School Finance Analyses" (Michael O'Leary and Jay Moskowitz); and (6) "The Empirical Argument for Educational Adequacy, the Critical Gaps in the Knowledge Base, and a Suggested Research Agenda" (William H. Clune). Each article contains references. (LMI)

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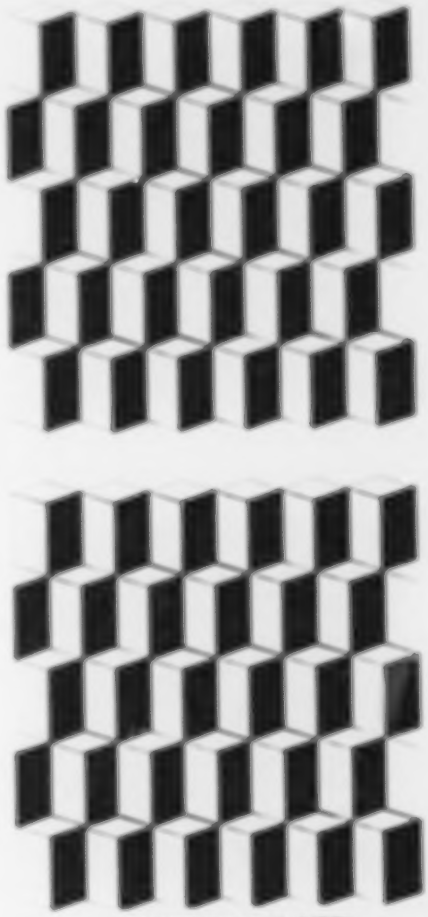
Selected Papers in School Finance 1995



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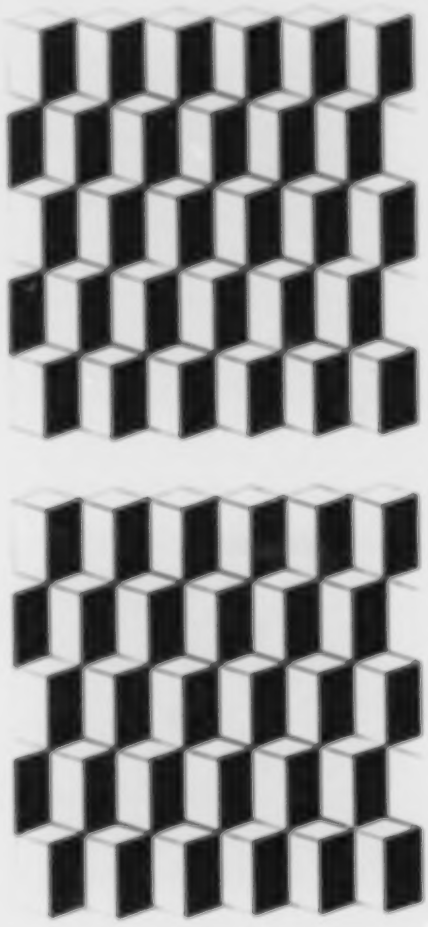

William J. Fowler, Jr., Editor

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Dedication

In memory of Charles Scott Benson, 1922–1994

This publication is dedicated to Charles S. Benson, a distinguished economist and educator at the University of California, Berkeley, who dedicated his life's work to improving education finance for students in poor and downtrodden school districts, which he believed trained them to wander from one minimum wage job to another.

Dr. Benson was a professor emeritus whose three decades at Berkeley were spent teaching educational administration and policy analysis. He also was the director of the National Center for Vocational Education, which studied the effects of education on employment. His text, "The Economics of Public Education," is still widely acknowledged as a classic in the field. Dr. Benson, a native of Atlanta, Georgia, received his bachelor's degree in economics from Princeton University and his master's and Ph.D. from Columbia University. Before joining the Berkeley faculty, he taught at Bowdoin College from 1950 to 1955 and at Harvard University from 1955 to 1963.

Although the editor did not have the pleasure of knowing Dr. Benson personally, those who did remember an erudite, trenchant, and amusing fellow whom others sought out as much for his humor as his insight and wisdom. The editor wishes to express his appreciation of Dr. Benson's lifelong efforts to change existing systems of school finance in distressed school districts. As G. Alan Hickrod confides in this volume, Dr. Benson testified before a U.S. Senate Committee:

> You must be very careful when you wish for things because you may just get what you wish for. We worked hard for equity in California. We got it. Now we don't like it.

Those contemplating a life journey similar to that of Dr. Benson, striving to improve the financing for education of students in distressed school districts, would do well to remember not only his enormous contribution to the education finance community and to students, but also his style, wit, wisdom, and especially, his kindness and willingness to help all those he encountered.

Foreword

Paul D. Planchon, Associate Commissioner

Elementary and Secondary Education Division

The National Center for Education Statistics (NCES) constantly reevaluates its efforts in the field of school finance by commissioning papers from distinguished members of the school finance research community, asking them to assess the data needs of the profession. Even when these data needs have been satisfied, a number of difficult statistical and measurement questions arise when conducting empirical and quantitative research. The papers presented here were commissioned by NCES to address the twin concerns of what additional school finance information NCES should collect and report, and how extant data might be analyzed to address interesting questions faced by the profession.

This report is the second in the renewal of this series, which previously was discontinued in 1977. The papers are intended to promote the exchange of ideas among researchers and policymakers. Because the views are those of the authors, the papers may provoke discussions, replications, replies and refutations. If so, the publication will have accomplished its task. There would be nothing so satisfying to the Center as promoting and contributing to the field of school finance.

Acknowledgments

The editor wishes to gratefully acknowledge the comments and suggestions of the reviewers: Lee M. Hoffman and Michael P. Cohen of the National Center for Education Statistics (NCES). I also wish to acknowledge the contributions of Mia Perona, Rebecca Pratt, and Phylis Greenfield of Pinkerton Computer Consultants, Inc. who edited the manuscript and incorporated the text and graphics into a published document.

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Introduction and Overview

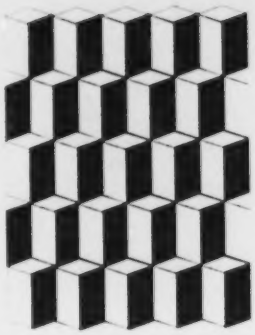
About the Author

Dr. William J. Fowler, Jr. is an education statistician at the U.S. Department of Education's National Center for Education Statistics (NCES) who specializes in school finance and educational productivity research. His work has centered on redesigning the federal school finance data collection to obtain information that can provide more policy-oriented analyses for the school finance community. NCES has reinstituted a state and school district finance data collection for the first time in more than a decade, and is currently funding exploratory research work.

Prior to his work at NCES, Dr. Fowler served as a supervisor of school finance research for the New Jersey Department of Education and taught at both Bucknell University and the University of Illinois. He also served as a senior research associate for the Central Educational Midwestern Regional Educational Laboratory (CEMREL) in Chicago and for the New York Department of Education.

Dr. Fowler has been a member of the American Education Finance Association since 1977, and was elected to its Board of Directors in 1992. He is a coauthor of *Disparities in Public School Spending, 1989–90*, and a coeditor of *Organizational Influences on Educational Productivity*, published by the JAI Press, and serves on the editorial board of the *Journal of Education Finance*. He obtained his doctorate in education from Columbia University in 1977.

Selected Papers in School Finance



Introduction and Overview

Introduction and Overview

William J. Fowler, Jr.
National Center for Education Statistics

The National Center for Education Statistics (NCES) commissioned the papers in this publication to address certain perplexing questions in education finance. Earlier papers in this NCES series focused on the nation's education finance information needs and concerned emerging education finance topics that posed statistical and measurement problems for the profession. This publication extends that tradition by first examining two policy related issues, whether money matters in education and the effect of state constitutional litigation. Certainly those involved with education policy have struggled to understand how money matters in education and must be astonished by educational research that finds no strong or consistent relationship between the two. Similarly, with more than 40 states having had the constitutionality of their state education funding systems challenged, and with a plaintiff success rate of about 50 percent, those involved with education policy must wonder if it is worth challenging a state funding system through the courts.

Additional papers explore three statistical and measurement problems that NCES has encountered. The first is how to measure resources at the student level rather than at the school or school district level, which is the custom today. NCES data bases on a sample of the nation's students contain impressive information about the education of the student, with the exception of the resources devoted to that student. Another statistical and measurement problem is what constitutes "good practice" when conducting education finance research using NCES data bases. Researchers tend to be idiosyncratic in their approach to preparing education finance data bases for analysis, but might a common approach be appropriate? The third, and most ambitious paper, struggles with a suggested research agenda for measuring educational adequacy. To obtain these papers, NCES turned to distinguished education finance researchers. NCES asked that they turn their knowledge, experience, and insights toward examining these issues, and to put their thoughts in publishable form.

Perhaps no more perplexing question arises than that of whether money matters in education. The first paper in this publication, by **Lawrence O. Picus** of the University of Southern California, explores the troubling finding that "there is no strong or systematic relationship between school expenditures and student performance" (Hanushek, 1989) and the

more recent work that has questioned that conclusion (Hedges, Laine and Greenwald, 1994). Rather than focusing on the complex statistical analyses and econometric production-function approaches, Picus reviews existing studies that attempt to ask the question: "Does Money Matter?" and considers alternative approaches to the question of whether or not resources might enhance achievement. First, Picus briefly presents the overall pattern of expenditures for elementary and secondary education during the last century, along with evidence on how student achievement has changed over time. He then turns to the debate between Hanushek and Hedges, et al. Finally, he offers some conclusions and policy recommendations.

Few policy analysts realize that, according to Hanushek, expenditures on education have grown faster than spending for health care, and represent some 3.6 percent of the Gross National Product (GNP) in 1990 (compared to 1 percent a century ago). This money has gone predominantly to hire more teachers, pay higher teacher salaries, and lower class sizes. Although it is often thought that the class sizes are the product of educating children with disabilities, Hanushek and Rivkin suggest only one-third of the recent decline in class sizes is accounted for by special education programs. Where has the other money gone? Hanushek suggests it has been used to pay teachers increased benefits, such as teacher retirement, unemployment compensation, social security contributions, and group insurance, such as health insurance.

As Picus points out, school districts spend an average of 60 percent of their current funds on instruction, and they show little variation in that percent. As many have observed, the substantial increase in education funds cited by Hanushek has not been matched by higher student outcomes on the average Scholastic Assessment Test (SAT) or on the National Assessment of Educational Progress (NAEP). The evidence for graduates to find and keep good, high paying jobs, however, is more encouraging. Card and Kruger (1990) found that students with small classes and higher teacher salaries had higher earnings in their adult years.

Picus begins his review of production-function studies of whether or not money matters in improving education by pointing out that students' socioeconomic status (such as their parents' education, occupation, and income) may be more important in determining how well they do in school than are many of the kinds of inputs considered in these econometric studies. Typical inputs that are examined for their relationship to student achievement include per-pupil expenditures, pupil/teacher ratios, teacher education, experience and salary, school facilities, and administrative arrangements.

The debate between Hanushek and Hedges, et al., is whether or not Hanushek should have included all the studies which had insignificant results, or for which the direction of the effect could not be determined. Even when Hedges, et al., exclude the studies which they believe to be inappropriate, they conclude that while money might matter, class size and teacher characteristics may not. Hanushek then asks, if this is their finding, what factors do in fact matter, since teachers' salaries and class size are the two largest determinants of spending. In a recent answer to Hanushek's question, Ferguson (1991) conducted research in Texas that leads him to conclude that hiring more and better teachers does lead to higher student test scores.

Picus concludes by observing that what we don't know is what the impact on student performance would be if schools or school districts were to dramatically change the way they spend the resources available to them. Undoubtedly, this debate will continue, although as Picus suggests, it

may be that the wrong question is being asked. Perhaps instead the question should be "How is Money Used in Education?"

The second paper, by **G. Alan Hickrod**, Distinguished Professor Emeritus at Illinois State University, examines the effect of constitutional litigation on educational finance. Some 44 states have experienced such litigation challenging their state aid to education systems. Hickrod reviews six empirical studies of either the effect of constitutional challenges, or studies that provide some data for the investigation of that topic. Hickrod (1992) studied the 1970–90 time period, and concluded that winning litigation in a state supreme court saw only a modest increase in per-pupil expenditures, but shifted the tax burden from state to local resources. Winning did seem to reduce disparities between school districts in spending per pupil. However, Heise (1995) did not find an increase in per pupil expenditures following the plaintiffs' successes in either Wyoming or Connecticut. Peternick (1995) studied 12 states where the state supreme court had found the state education aid system unconstitutional, and concluded that these decisions did stimulate growth in per-pupil expenditure. These studies differ in that Heise-Peternick assume some single, sharp increase, while Hickrod believes that the state legislature is faced with a winning court decision, compliance litigation, and increasing pressure to modify the state aid system in a way that is beneficial for the successful plaintiff school districts.

What makes the research so difficult is that plaintiff challenges might be characterized in different ways, such as "a clear win," or "a loss," followed by yet another filing, under yet another legal theory. In other states, litigation has been filed, but no hearings have been held or decisions rendered. Assigning "climate" to this body of litigation is not precise. Hickrod examines whether or not there might be the effect that if a state chooses to reduce disparity in spending between school districts (an equity goal), that perhaps the overall funding level of the state will suffer (an adequacy goal). He finds no significant relationship between adequacy and equity goals. He also finds that the data support the notion that the state supreme court decision in favor of the plaintiff school districts reduces expenditure disparity between school districts within states, even if they are not related to increases in average per-pupil expenditures in those states.

Hickrod concludes by examining anecdotal evidence from 11 states. He also addresses some unanswered questions. While Hickrod asserts that constitutional litigation is one factor in explaining the changes in state funding for education, it is not the only factor. However, he confirms that it is worth challenging the funding of K–12 education via the courts, albeit that the legal process can be quite expensive and very time-consuming. In addition, chances of losing the case are quite high, as only 17 states have successfully defended their funding system. Hickrod correctly observes that public education is like absolutely no other public service, in that it has its own article in every single state constitution in this nation.

The remainder of the papers explore statistical and measurement problems that NCES has confronted. A perplexing dilemma faced by NCES is how to measure student-level resources, perhaps to accompany NCES student-level education and personal characteristics data, when most financial data reside at the school-district level. **Robert Berne** is Vice President for Academic Development at New York University, and his coauthor, **Leanna Stiefel**, is professor of economics at the Robert F. Wagner Graduate School of Public Service at NYU. They are perhaps best known for their classic work in *The Measurement of Equity in School Finance* (1984).

The purpose of the Berne and Stiefel paper is to discuss the types of student-level resource measures that would be preferred if student-level resource data were collected on a routine basis. They begin by exploring the types of questions that could be answered with student resource data. They then review selected literature to show how some education finance researchers have attempted to answer such questions with extant data. They also introduce some cost accounting concepts that are useful in thinking about how to collect appropriate student-level resource data. They conclude by recommending alternatives for NCES to consider.

Berne and Stiefel believe there are three questions that student resource data could answer. The first has been termed **production function** questions, that is, questions of resource effectiveness and cost-effectiveness. Examples are: Do additional resources for children lead to additional outcomes? and What is the cost effectiveness of one program versus another? The second type of question that might be answered with these student resource data are **equity** questions. One examples is: Whether poor students receive the same (or greater) resources than other students in a school, or an educational program, such as preschool education. A third type of question is termed a **resource intent** question. If a student is entitled to specific resources, such as handicapped, bilingual, or compensatory education, do they receive the additional resources which were intended to be assigned to them?

Using illustrative studies, Berne and Stiefel demonstrate that "...even when researchers are careful to put together a comprehensive and unique data set, they cannot always obtain resource variables at the correct unit of analysis." The reason for this is that these studies often use administrative data because it is available, rather than because they prefer such data. In addition, data at the student level are preferable in production-function studies to data disaggregated from the school district level. This is particularly true because student outcomes might be sensitive to resources not currently available in administrative records at the school district level.

Examining equity studies, Berne and Stiefel conclude that data problems immediately emerge with administrative data from different sources, merged together for an equity study. For example, pupil counts of students in programs may not match students funded. Expenditures for employee benefits, transportation, school lunches, or utilities may be omitted.

Berne and Stiefel include four resource intent studies in their review. These employ cost accounting methods which are expensive, and use a bottoms-up approach that identifies the student and program of interest, and then assigns expenditures to a child in that program. The cost accounting method is valuable because it emphasizes the need to conceptualize the use of the expenditure data before the data are collected.

Turning to concepts of costing, Berne and Stiefel explain the distinction between **departmental** and **product** costing methods where distinctions are made between how full costs can be subdivided, how expenditures can be allocated to students, and the difference between "costs" and "expenditures." **Departmental** costing finds the costs of administrative units, such as school districts, departments, responsibility centers, etc. The primary purpose of departmental costing is to help managers administer units efficiently. **Product** costing, in contrast, finds the costs of producing various kinds of products. Berne and Stiefel argue that product costing is relevant because this is where most of the questions to be answered with the resource data are focused.

Berne and Stiefel also argue that these three questions require resources linked to

students, rather than schools or school districts. Products are assigned their **full costs** if the total of all products equals the organization's total costs. **Direct costs** are those that can be assigned uniquely to one product. **Indirect costs**, on the other hand, are incurred because of the production of many products, and are frequently considered overhead costs. When students are the product, instructional supplies are an example of direct costs, while the principal's time is an indirect cost. Two systems are generally used for assigning direct costs to products. **Job-order costing** determines the costs of each individual unit of a product, for example, the cost of fine, hand-made, custom-ordered furniture. **Process costing** determines the costs of groups of identical units and then divides the number of units to obtain an average cost. An example might be the cost of a box of breakfast cereal. Job-order costing is more accurate, but much more difficult and expensive to collect. For education, most likely a mixed model would be used, such as assigning resource costs to types of students, rather than individual job order costing.

Berne and Stiefel conclude with recommendations, framed by the purpose for which the student-level resource measure will be used. They believe the student-level resource measure should be developed to assess the effectiveness of resource use, requiring the linking of resources with student outcomes. They argue that NCES should proceed to develop a student-level resource measure, regardless of whether the data are actually collected. They assert a student-based system (product costing) will be required. They also urge NCES to collect full costs, direct versus indirect costs, at different educational programs. The measure must include the sources of funding, such as local, state, or federal. Finally, for those costs that must be allocated, guidelines must be developed for the basis and method of allocation. This student-level resource measure, obtained on a sample of students (like many existing NCES student-level data sets), would permit NCES to begin to make progress on the question of effective use of resources in education.

The next paper on statistical and measurement problems that NCES has contended with is by **Michael O'Leary** of Coopers & Lybrand and **Jay Moskowitz** of Pelavin Research Institute. They explore some of the steps that were required to be taken before conducting various finance studies from NCES data sets. Although some of the problems they cite from the work that was undertaken in 1994 have been corrected in later editions of the NCES Common Core of Data (CCD) CD-ROM, the procedures they recommend are always appropriate to ensure accurate results. Although the authors acknowledge that individual research methods will (and should) always vary, if the data bases are constructed with the same sets of underlying procedures, researchers' conclusions can be debated on their merits, rather than on differences in underlying data sets. O'Leary and Moskowitz begin by pointing out that the school district finance collection undertaken by the U.S. Bureau of the Census typically contains a universe of more than 16,000 school districts in years ending in 2 or 7 (1992, 1997). In other years, the data are collected only for school districts larger than 15,000 students, or if the school district is fiscally dependent upon a county or city.

The number of school districts not processed by Census also varies by the year of the sample. NCES also requested that Census collect and process a universe of school districts in 1990, to accompany another NCES project, mapping decennial census demographic information (such as median income) to school district boundaries.

O'Leary and Moskowitz also explain that the NCES Common Core of Data (CCD) CD-ROM contains data at three different levels (state, school district, and school) from five

different NCES surveys. The CCD CD-ROM typically contains five years of data for each of these levels. As a result of this complex structure, O'Leary and Moskowitz find three issues arise: sampling issues; school district types, and school district levels. Education finance researchers have sometimes spent considerable time and resources exploring why revenue data did not exist for many school districts over a decade. Other researchers weighted non-missing districts, or imputed values for missing districts, although the effect on the research results is unknown. There are also a variety of "special" school districts, including community colleges, vocational-technical school districts, correctional/custodial school districts, special education, and non-operating school districts. Non-operating districts have students but no buildings, and typically transfer their resident children to other school districts to be educated. These districts are typically not included in equity and education finance analyses. O'Leary and Moskowitz also explain that there are four basic "levels" of districts in the Census F-33 collection: elementary only; secondary only; unified K–12, and college-graded. Researchers are urged *not* to only deal with a single type, such as unified, because some states do not have this type of school district organization, and others have "mixed" models. Different researchers have approached this differently, although virtually everyone pupil-weights [see the classic work *The Measurement of Equity in School Finance* (Berne and Stiefel, 1984).]

O'Leary and Moskowitz also discuss unresolved data base creation issues, such as enrollment; special-needs pupils; property, poverty, and income data; and state and district finances. Although NCES and Census enrollment counts are now likely to be the same, it is still impossible to separate funds targeted for special-needs pupils from those allocated through basic state education aid programs to school districts. Regarding district finances, NCES has resolved "on-behalf" funds by imputation for current years, and the Governmental Accounting Standards Board (GASB) has included the collection and reporting of these numbers at the school district level, beginning in 1995. However, "outliers," erroneous and extreme values of per-pupil expenditures or revenues, will always plague data reporters such as NCES, especially when reporting values for more than 16,000 school districts. O'Leary and Moskowitz conclude their discussion with a model of "suggested best practice" when creating an analysis data set from NCES education finance data.

The last paper to explore statistical and measurement problems encountered by NCES is a suggested research agenda for exploring educational adequacy, by **William H. Clune** of the University of Wisconsin-Madison. Clune explains that the goal of educational adequacy, defined as high minimum educational outcomes for the disadvantaged, is constrained by the lack of a strong knowledge base, and that a well-formulated research agenda could make an important contribution to education policy. Clune argues that while better student educational outcomes have never been more highly valued, the link between these outcomes and educational reform and investments is widely doubted. This has the most poignant effect upon education for the disadvantaged, where poor children compose the majority of students with poor educational outcomes. Under such doubts, strains are developing in the traditional goal of equity in education finance. Traditional equity arguments guarantees equitable inputs regardless of outcomes. Now cost-effectiveness and productivity goals intrude. Clune argues that if society and the courts become satisfied that high minimum educational outcomes can be produced at minimum cost, then this strain will be minimized, and additional funds will become available.

Adequacy can only be assessed, Clune argues, when it refers to some outcome. Levin (1991) demonstrated that compensa-

tory spending could be based on the benefits of good education and the social costs of a poor education. Unfortunately, it is difficult to be certain that compensatory spending in the present will reduce crime costs in the future, particularly for today's taxpayers. Fortunately, Clune asserts, standard setting for education is well established, providing some notion of educational adequacy. Turning to the available resources to establish adequacy, Clune explains that educational spending has grown faster than the cost of living for many decades, and maintains its relative position even in the midst of calls for austerity. Very few call for the outright repeal of educational subsidies, or the rollback of universal high school education. Clune remains optimistic "...that a substantial amount of extra money could be found for adequacy."

Clune is skeptical about disagreement in measuring adequacy, although courts frequently develop long lists of desirable outcomes for education (*Rose v. Council for Better Education, Inc.*, 790 s. w. Ken. 2d 186, 212-13 [1989]; and Kentucky and California student tests result in many students unable to attain "proficient" scores (Kirst et al., 1995). He believes that there is more theoretical than practical confusion, as a simple working definition of adequacy includes literacy, numeracy and problem solving, and completion of high school in a manner sufficient to be eligible for further education. Clune then suggests that "high minimum achievement" might be defined as the attainment of average achievement by disadvantaged children. This high minimum achievement would be equal to the achievement of the average child in the nation. Policymakers, he argues, would benefit from a fleshing out of the various operational definitions of adequacy.

One problem that Clune touches on is the problem of educational adequacy in high-poverty schools. He asserts that there is still confusion regarding whether children that have not reached educational adequacy may, "within any reasonable range of resources" achieve high minimum performance. Although Slavin and his colleagues (Slavin, 1994), claim to be able to raise the reading achievement of elementary students to average grade levels, no data on costs accompany this claim. Clune argues that the maintaining of an evaluation data base (including, presumably, costs) for a group of "accelerated schools" would be " well worth the investment."

The basic elements of successful accelerated education have been known for some time, Clune asserts, and they are an accelerated curriculum, high expectations for student learning, a positive school climate, and a safe and orderly environment. The ultimate goal of educational adequacy is accelerated education, for if poor children learned at the same rate as other children, they would not be educationally disadvantaged. Thus Clune adds to the evaluation data base the element of educational process, or teaching technology.

We need a fine-grained understanding of what staff and students do differently in order to begin understanding the conditions under which such desirable behaviors can flourish. Careful investigation of schools adopting models of accelerated education are, therefore, a promising direction for research.

The New Jersey Supreme Court reasoned that a good estimate of the cost of an adequate education is the resources available to the state's most successful students, those in the highest socioeconomic school districts in the state. This highlights that the cost of an adequate education is not known. Assume that the additional costs to educate a child in poverty are $2,000, the question becomes, $2,000 in addition to what? As is apparent, future education finance research must conduct the types of studies of accelerated schools that could flesh out the costs for remediating a disadvantaged child. Clune

also asserts that research is needed on school aid formulas, in order to provide sufficient "base" funding and to fully cover the additional costs of remediation. Clune also believes research is needed about the type of governance structures capable of tolerating and encouraging the reforms that will bring about educational adequacy for students in poverty.

Clune concludes by listing the ten research questions that need to be addressed by a research agenda focused on educational adequacy. Much of the agenda depends on gathering more data from existing accelerated schools, which, unfortunately, are not very common in the nation. Another strategy would be to turn to useful secondary data sources about educating students in poverty. Not all of this research needs be undertaken by government. Foundations and the voluntary cooperation of research scholars and research centers might undertake such challenging educational research.

Summary

The papers published here are but a single component of the continuing efforts of NCES to obtain and provide education finance data of interest and utility to the school finance community. The first two papers suggest that the debate regarding the efficacy of money for education will continue, and that NCES will be called upon to provide even more financial data that can inform the discussion. A crucial component of the "Does Money Matter?" argument revolves around "good practice" in constructing the data base for analysis. In addition, the controversy makes the need for a student-level resource measure even more critical. The courts, as well as the education finance community, are likely to attend not only to the efficacy of money, and the effectiveness of state constitutional litigation, but also to the development of a standard of educational adequacy.

The previous publication, *Selected Papers in School Finance, 1994*, asserted that NCES also wishes to make known conceptual and methodological advances in the field of education finance, for researchers and students alike to emulate, replicate, disseminate, and enhance. That previous volume described the evolution of this series of papers, and other NCES products, such as the CCD CD-ROM, which have provided education finance data in a readily accessible form for all school districts in the nation. At that time NCES had also just started work on a geographic cost adjustment (Chambers and Fowler, 1995), and will soon release an even more sophisticated geographic and inflation adjustment (Chambers and Fowler, forthcoming).

New Developments

The education finance reporting needs of Congress, the Department, states, and the education finance research community are constantly shifting and expanding, as are financial reporting standards, rendering NCES surveys and reports outdated, although they were previously thought to be satisfactory for at least a future decade. This turbulent environmental press has created the need for NCES to have the capability to proactively undertake "developmental analysis."

The Education Finance Statistics Center (EFSC) is a specifically-designed Education Statistical Services Institute (ESSI) component to carry out the NCES need for developmental analysis to increase NCES' knowledge, capacity, data collection, and reporting in education finance. Concomitant with developmental analysis, the EFSC might share advances with states facing similar finance dilemmas, offering technical assistance to improve their fiscal reporting systems.

The EFSC is currently conducting three developmental activities: assessing how accounting changes effect NCES surveys and financial reporting; devising experimental measures in education finance, such as measuring the cost of educating students with special needs; and assessing the need for technical assistance to states. A small portion of its budget is to administratively carry out these three developmental activities.

The activities started by the EFSC, while addressing some of the immediate definitional, measurement, collection and reporting dilemmas and policy choices currently faced by NCES, do not capture the future developmental challenges in education finance. This requires proactively anticipating the next threshold in education finance: where the profession seems to be headed and what questions future public and policy demands will create.

Future EFSC activities need to revolve around developmental challenges in education finance, attaining an increase in theoretical knowledge, analytic capacity, data collection frequency/methodology, and financial reporting. For NCES to attain the next threshold in education finance, and to retain preeminence in the field, definitional, measurement, collection and reporting dilemmas will have to be explored through developmental analysis by the EFSC.

Among the projects NCES anticipates exploring in the next year are:

1. **Anticipating changes in accounting standards**

NCES fiscal surveys will be affected by changes in accounting standards promulgated by the Financial Accounting Standards Board (FASB), which changes the IPEDS postsecondary finance collection and the planned K–12 private school finance collection. Both the state-level National Public Education Financial Survey (NPEFS) and the school-district-level F-33 collection will be influenced when the Governmental Accounting Standards Board (GASB) acts at the beginning of 1997.

2. **The acquisition, analysis, and reporting of school-level data**

The dilemma is how to conduct nationwide school-level analyses that will enable NCES to report on administrative overhead and program cost, either by collecting school-level finance data from state administrative records in those states that have such information or amending the NCES Schools and Staffing Survey (SASS) to contain resource allocation information.

3. **Experimental measures of programmatic expenditures and costs**

There is no agreement on how to obtain and measure programmatic expenditures in education. Programmatic expenditures are the expenditures for a program, such as compensatory education, bilingual education, or handicapped education. Expenditures do not necessarily represent the actual cost of an educational program—ways to explore differences between cost and expenditure need to be developed.

4. **Using geographic and inflationary cost adjustments**

NCES is in the process of developing both geographic and inflationary cost adjustments. However, how these indexes should be applied to education finance data requires further conceptual development. This project will examine whether the *Digest of Education Statistics* and the *Condition of Education* might use the geographic and inflationary cost adjustments in reporting financial data.

NCES has established its own home page at **http://www.ed.gov/NCES** and the EFSC also has a home page on education finance at **http://www.ed.gov/NCES/efsc**. From these sites, individuals can obtain products and publications, such as CD-ROMs or geographic and inflation cost adjustments; request specific data sets or download them; review frequently asked questions about the NCES education finance program; and email NCES staff (see graphic of EFSC home page).

NCES hopes these developments will further assist the education finance community in its research and data needs.

Does Money Matter in Education? A Policymaker's Guide

Lawrence O. Picus
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About the Author

Dr. Lawrence O. Picus is an Associate Professor in the School of Education at the University of Southern California (USC). He is the director of the Center for Research in Education Finance (CREF), a School of Education research center whose purpose is to study issues of school finance and productivity in the wake of the recent school reform movement. He is also the president of the American Education Finance Association.

In his role with CREF, Dr. Picus is involved with studies of how educational resources are allocated and used in schools across the United States. He also has conducted studies on the impact of incentives on school district performance and is a member of a number of professional organizations dedicated to improving school district management.

Dr. Picus is the co-author of *School Finance: A Policy Perspective* (McGraw-Hill, 1992) with Allan Odden, and of *Principles of School Business Administration* (ASBO, 1995) with R. Craig Wood, David Thompson, and Don I. Tharpe. In addition, he is the editor of the 1995 yearbook of the American Education Finance Association, *Where Does the Money Go? Resource Allocation in Elementary and Secondary Schools* (Corwin, 1995).

Prior to coming to USC, Dr. Picus spent four years at the RAND Corporation where he worked on a number of research projects including a major study of the effects of intergovernmental grants on local school district expenditure patterns. From 1977 to 1983, Dr. Picus was a principal investigator for the Northwest Regional Educational Laboratory's Center for State Policy Studies, and conducted a number of studies on issues of concern to chief state school officers in the Northwest and Hawaii. He was also the principal investigator for a number of school district specific studies concerning management issues such as management information systems, pupil transportation, school facility usage and strategic planning.

Dr. Picus earned a Ph.D. in Public Policy Analysis from the RAND Graduate School. In addition, he holds a master's degree in social science from the University of Chicago, and a bachelor's degree in economics from Reed College. He has a strong background in research design, statistics and econometrics, and is an expert in the application of microcomputers.

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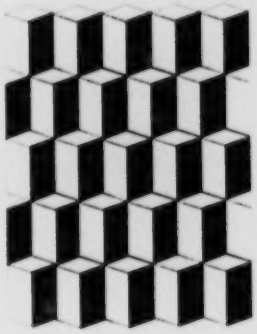

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There is no strong or systematic relationship between school expenditures and student performance. (Hanushek 1989, 47)

Relying on the data most often used to deny that resources are related to achievement, we find that money does matter after all. (Hedges, Laine, & Greenwald 1994, 13)

Introduction

On the surface, it would seem that the expenditure of more money for education would lead to improved student outcomes. Certainly if one were to ask a school teacher or school administrator, they would say that more money would help them provide a higher quality education, which in turn would lead to greater student achievement. Few in education would suggest differently, and it is rare indeed for a public school official to say that they could do more with less money, or even with the same amount of money.

Many important educational programs aimed at improving opportunities for groups of students with special needs are based on the assumption that additional resources are essential to their success. Compensatory education programs such as the Federal Title I Chapter I program and funding for special education are the two largest examples of these programs. Recently, Clune (1994) suggested that to ensure children in poor schools have the opportunity to achieve at high levels, it might be necessary to provide as much as $5,000 per student in additional resources.

Despite this general belief that "money matters," the statistical evidence of a relationship between spending and student outcomes has been mixed. During the 1980s, Eric Hanushek conducted an in-depth analysis of education production function studies and concluded that there is little evidence to support the existence of a relationship between the amount of resources and student achievement (1981, 1986, 1989, 1991). Others, notably Murnane (1991), Ferguson (1991), and most recently Hedges, Laine, and Greenwald (1994), have questioned Hanushek's conclusion, arguing that money does in fact matter.

To date, this debate has focused on complex statistical analyses and detailed discussions about whether or not the production function approach is appropriate for

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...growth in expenditures for education was more than three times as fast as growth in the GNP, with the result that K–12 education now represents some 3.6 percent of GNP in 1990 compared to less than 1 percent a century before.

estimating relationships between spending and student achievement. Much of the debate on the effect of resources on student achievement has been based on the production function approach. Yet as Monk (1992) points out, most efforts to define an educational production function have failed. Despite the inability to relate educational inputs to outcomes, the strong belief that money is important to improving school performance maintains a strong following (see for example, Murnane [1991]).

Recently a number of researchers, notably Picus (1994a) and Cooper (1993), have looked closely at how school districts and school sites use the dollars they actually receive. The most stunning conclusion from this work is the consistency in the pattern with which schools spend the funds they receive. Across the United States, schools spend approximately 60 percent of their resources on direct student instruction. This figure holds true regardless of how much is spent per pupil, and seems to be consistent across grade levels. These findings suggest that the effectiveness of new money on student achievement may be limited by the fact that these new resources are used in the same way as existing resources, limiting the potential effectiveness of those new dollars.

Given that the United States spent over $250 billion on K–12 public education last year, understanding the impact that money has on student outcomes is important. The purpose of this paper is twofold:

1. To review existing studies that attempt to answer the question "does money matter?," and provide an objective analysis of the debate in terms of policy outcomes for policymakers; and

2. To consider alternative approaches to answering the question of whether or not additional resources lead to gains in student outcomes.

To address these issues, the second section of this paper offers a brief discussion of the data on which this discussion is based, tracing the overall pattern of expenditures for elementary and secondary education in the United States during the last century, along with evidence on how student achievement has changed over time. The third section digs more deeply into the production function analyses on the effects of resources on student performance, focusing most of its attention on the current debate between Hanushek and Hedges, Laine, and Greenwald. This section also discusses a number of alternative approaches that merit consideration in attempting to ascertain whether or not there is a relationship between spending and student performance. Finally, the fourth section offers some conclusions and policy recommendations based on the data presented in the earlier sections of the paper.

General Trends In Expenditures And Student Outcome

Expenditure Trends

Hanushek (1994b) shows that real expenditures (inflation adjusted to 1990 dollars) for public K–12 education in the United States increased from $2 billion in 1890 to nearly $190 billion in 1990. He further points out that growth in expenditures for education was more than three times as fast as growth in the Gross National Product (GNP), with the result that K–12 education now represents some 3.6 percent of GNP in 1990 compared to less than 1 percent a century before. Hanushek also states that expenditures on education have grown faster than spending for health care. This is interesting given the intense debate over the growth in health care costs and the relatively little attention spending increases in education have received.

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Picus (1994a) showed that real per pupil expenditures in the United States increased by nearly 70 percent during the 1960s, almost 22 percent in the 1970s, and over 48 percent in the 1980s. The total compound increase in educational expenditures between 1959–60 and 1989–90 amounted to 206 percent. Table 1 updates Picus' data, and shows that real per pupil expenditures increased by over 207 percent between 1959–60 and 1991–92. Spending on K–12 education represented approximately 2.8 percent of GNP in 1960, 4.0 percent in 1970, and 3.6 percent in both 1980 and 1990.

Table 1 also shows the dramatic variation in spending increases across the 50 states and the District of Columbia during that 33 year period. At the extremes, expenditures in New Jersey increased by over 410 percent, more than four times as fast as they did in Utah where the increase was just over 100 percent. Real per pupil expenditures in New Jersey were only $306 higher than they were in Utah in 1959–60. However, by 1991–92 that difference had grown to $6,277, and New Jersey spent three times as much per pupil as did Utah.

What has this additional money bought? The most obvious answer is more teachers. Barro (1992) estimated that teacher salaries account for 53 percent of all current spending by school districts. Moreover, he estimated that as districts receive additional funds, they spend approximately half on teachers, with 40 percent going to reductions in class size and 10 percent devoted to increased teacher salaries. To demonstrate the effect of this emphasis on reducing class size, the *Digest of Education Statistics* (NCES 1994) shows that nationally, the pupil teacher ratio in public K–12 schools has declined from 26.9 in 1955 to 17.6 in 1994. Moreover, the pupil teacher ratio declined every year but one between 1955 and 1990, and has hovered between 17.2 and 17.6 since 1990.

One reason for this decline is often thought to be the increase in the number of children with disabilities. Since these children are more difficult to educate, they often are enrolled in much smaller classes. Yet Hanushek and Rivkin (1994) show that special education programs account for less than one-third of the recent decline in the pupil/teacher ratio. This means that efforts to reduce regular class sizes have succeeded as well in most states despite limited evidence that smaller classes substantially improve student learning (see, for example, Glass and Smith [1979]; Hanushek [1986, 1989]; and Word et al. [1990]).

Of course if Barro's estimates are correct, then half of the average increase in spending goes to objects other than teacher salaries. One factor that is responsible for considerable growth in spending in recent years has been benefits paid to school personnel. Hanushek estimates that these so-called fixed charges grew from 7 percent to 14 percent of total spending between 1960 and 1980 (comparable data were not available for 1990). These increases are tied both to the increased number of teachers and other personnel, and to the growing costs of providing benefits such as health care and retirement. There are a number of other important functions that must be considered in the operation of a school system. Central administration, for example, only represents some two to three percent of total expenditures, while operations and maintenance account for approximately ten percent of educational expenditures. Table 2 provides a breakdown on how the more than 15,000 school districts in the United States allocated their funds in 1990–91.

Table 2 shows that school districts spent an average of 60 percent of their current funds on instruction. Research by Picus (1993a, 1993b, and 1994a) not only confirmed that figure, but shows in Table 3 that there is very little variation in that 60 percent figure, despite substantial variations in total

...as districts receive additional funds, they spend approximately half on teachers, with 40 percent going to reductions in class size and 10 percent devoted to increased teacher salaries.

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Table 1.—Changes in real expenditure per pupil in average daily attendance (ADA) in public elementary and secondary schools, by state: 1959–60 to 1991–92 (in constant 1991–92 dollars)

State	Current Expenditures Per ADA 1959–60	Current Expenditures Per ADA 1991–92	Percent Change 1959–60 to 1991–91
United States	$1,765	$5,421	207.14%
Alabama	1,134	3,616	218.87
Alaska	2,570	8,450	228.79
Arizona	1,898	4,381	130.82
Arkansas	1,059	4,031	280.64
California	1,994	4,746	138.01
Colorado	1,863	5,172	177.62
Connecticut	2,051	8,017	290.88
Delaware	2,144	6,093	184.19
D.C.	2,028	9,545	370.66
Florida	1,494	5,243	250.94
Georgia	1,192	4,375	267.03
Hawaii	1,527	5,420	254.94
Idaho	1,363	3,556	160.90
Illinois	2,062	5,670	174.98
Indiana	1,734	5,074	192.62
Iowa	1,730	5,096	194.57
Kansas	1,636	5,007	206.05
Kentucky	1,096	4,719	330.57
Louisiana	1,749	4,354	148.94
Maine	1,330	5,652	324.96
Maryland	1,847	6,679	261.61
Massachusetts	1,923	6,408	233.23
Michigan	1,952	6,268	221.11
Minnesota	2,000	5,409	170.45
Mississippi	969	3,245	234.88
Missouri	1,618	4,830	198.52
Montana	1,932	5,423	180.69
Nebraska	1,585	5,263	232.05
Nevada	2,025	4,926	143.26
New Hampshire	1,633	5,790	254.56
New Jersey	1,823	9,317	411.08
New Mexico	1,706	3,765	120.69
New York	2,642	8,527	222.75
North Carolina	1,116	4,555	308.15
North Dakota	1,725	4,441	157.45
Ohio	1,717	5,694	231.62
Oklahoma	1,465	4,078	178.36
Oregon	2,109	5,913	180.37
Pennsylvania	1,926	6,613	243.35
Rhode Island	1,944	6,546	236.73
South Carolina	1,035	4,436	328.60
South Dakota	1,631	4,173	155.86
Tennessee	1,120	3,692	229.64
Texas	1,563	4,632	196.35
Utah	1,517	3,040	100.40
Vermont	1,618	6,944	329.17
Virginia	1,290	4,880	278.29
Washington	1,978	5,271	166.48
West Virginia	1,216	5,109	320.15
Wisconsin	1,943	6,139	215.95
Wyoming	2,118	5,812	174.41

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics: 1994* (NCES 94-115), Table 166.

Table 2.—Total K–12 expenditures, by function: 1990–91

Category	Expenditures (in thousands)	Percent of Total Expenditures	Percent of Current Expenditures
Current Expenditures	$201,549,624	88.04%	
Instruction	122,214,281	53.38	60.64%
Student Services	70,419,509	30.76	34.94
Students	8,933,843	3.90	4.43
Instructional	8,467,453	3.70	4.20
General Administration	5,781,474	2.53	2.87
School Administration	11,680,254	5.10	5.80
Operation & Maintenance	21,323,871	9.31	10.58
Student Transportation	8,666,697	3.79	4.30
Other	5,565,916	2.43	2.76
Food Services	8,276,621	3.62	
Enterprise Operations	639,213	0.28	
Other Current Expenditures	3,298,439	1.44	
Capital Outlay	19,770,913	8.64	
Interest On School District Debt	4,314,321	1.88	
Total	228,933,297		

SOURCE: U.S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1993*. (NCES 93-292). Table 159. *Digest of Education Statistics, 1994*. (NCES 94-115). Table 160.

Table 3.—Variation in per-pupil expenditures and the proportion of resources devoted to instruction

	Actual		Cost Adjusted		
Statistic	Per Pupil Expenditures for Current Operations	Per Pupil Expenditures for Instruction	Per Pupil Expenditures for Current Operations	Per Pupil Expenditures for Instruction	Instruction as a Percent of Total Expenditures
Mean	$3,659	$2,137	$3,698	$2,194	$59.16
Std. Dev.	1,912	961	1,759	825	6.28
Coefficient of Variation (%)	52.4	45.0	47.6	38.1	10.6

NOTE: These data are from the 1986–87 Census.
SOURCE: Picus, L.O. 1993. "The Allocation and Use of Educational Resources: District Level Evidence from the Schools and Staffing Survey." Los Angeles, CA: The Finance Center of CPRE, Working Paper Number 34.

expenditures per pupil, and in expenditures per pupil for direct instruction. This pattern has been confirmed by other researchers, most notably Bruce Cooper (1993, 1994). As discussed later in this paper, this lack of variation in the pattern of resource allocation may be part of the reason links between spending and student outcomes have been hard to find, and may well offer possibilities for making the allocation of resources more productive in the future.

The results of standardized tests, international comparisons of student performance, and other measures of the outcomes of schooling...have not shown the same kind of increase as has real per pupil spending.

Trends in Student Outcomes

Despite this substantial increase in spending for education, many observers have pointed out that student outcomes have not improved substantially, if at all. The results of standardized tests, international comparisons of student performance, and other measures of the outcomes of schooling like attendance rates and college enrollment have not shown the same kind of increase as has real per pupil spending. However, many argue that another important outcome of schooling is success in the labor market, and some have been able to link higher cost resource allocation patterns to improved career earnings. This section begins with a discussion of student performance as typically measured in education circles, focusing most heavily on the results of standardized tests. It concludes with a brief discussion of labor market outcomes and their relation to school spending.

Measures of Schooling. Despite the substantial increases in per pupil spending observed over the last 30 to 35 years, there has not been a commensurate improvement in student performance as measured by scores on standardized tests. One of the most commonly used measures of student performance is the average Scholastic Assessment Test (SAT) score. Figure 1 compares the average SAT score for high school seniors with the change in real per pupil spending between 1968 and 1993. This familiar figure is often cited in discussions of why more money will not lead to greater student outcomes. Equally well known are the arguments that discredit this analysis. They include the increase in the number of students taking the SAT, the higher numbers of minority students and the higher number of students for whom English is not their first language who are taking the exam. As a result, some argue that the trend in SAT scores is not only expected, but that it represents an improvement over the past.

Bracey (1994), for example, argues that the standards for the SAT were set in 1941 based on the performance of less than 11,000 students, 98 percent of whom were white, 60 percent of whom were male, and most of whom lived in the Northeast. Moreover, a very high proportion attended private high schools and intended to enroll in private colleges and universities. Bracey goes on to suggest that the bell curve imposed on this group led to only 6.68 percent of them scoring above 650 on the mathematics section of the SAT. Today, prior to the recentering of the SAT scores, some 11 percent of the more than one million students taking the test score above 650 on the mathematics section of the test, despite the fact that 30 percent are minority, 52 percent female, and over 30 percent come from families with incomes less than $30,000 per year. However, only 3.3 percent score that high on the verbal portion of the test (*Digest of Education Statistics, 1994*).

What is clear is that the SAT results do not provide a definitive answer to the question of whether or not the additional money spent on education leads to improved student outcomes. Moreover, because of the diversity in school districts, and the variation in the percentage of students taking the SAT across states, it is not possible to correlate average state or district SAT scores with per pupil expenditures.

Another way to measure trends in student performance is to review the results of the National Assessment of Educational Progress (NAEP) over time. Mullis et al. (1994) show the following trends in performance for students age 9, 13, and 17 in science, mathematics, reading, and writing:

- **Science.** Performance in science declined for all three age groups in the 1970s, but improved during the 1980s. By 1992, science performance at age 9 was higher than it was in 1969–70, while it was lower

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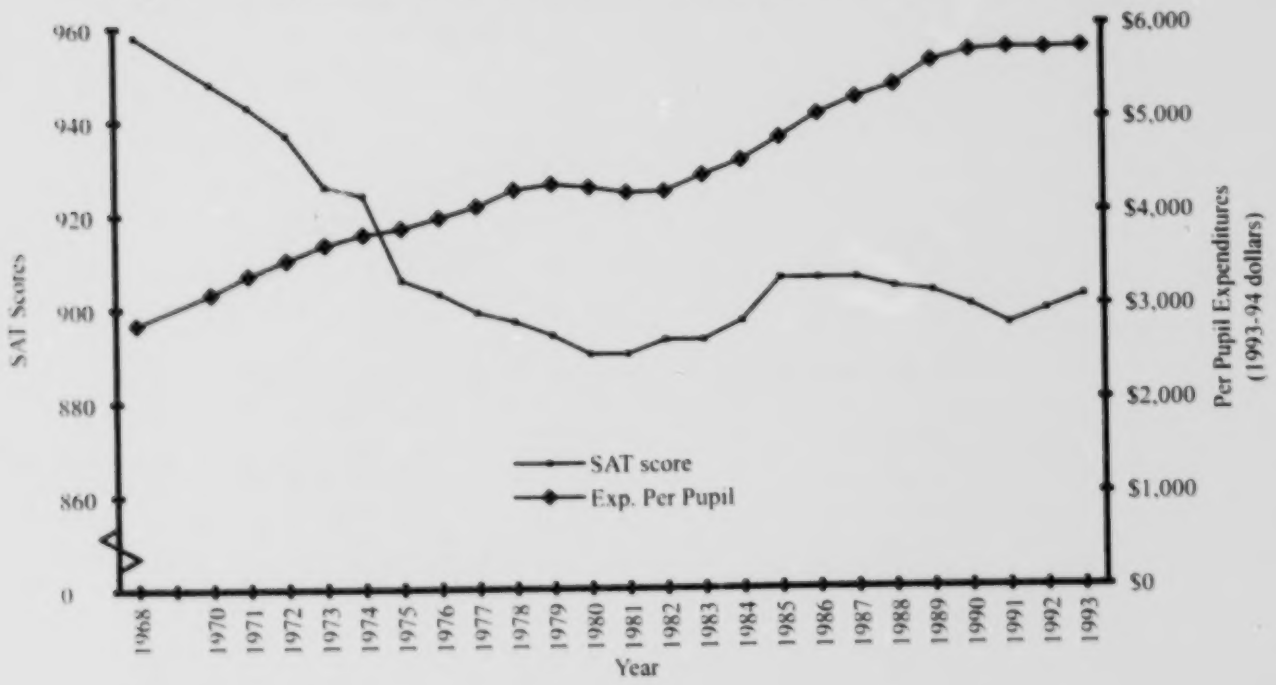
Figure 1.—Trends in SAT scores and per-pupil expenditures: 1968 to 1993



SOURCE: U. S. Department of Education, National Center for Education Statistics, *Digest of Education Statistics, 1994*. (NCES 94-115)..

for 17-year-olds and the same for 13-year-olds. Thus, only 9-year-olds performed significantly better in science in 1992 than did 9-year-olds in 1969–70.

- **Mathematics.** Proficiency in mathematics improved between 1973 and 1992 for those aged 9 and 13, while for 17-year-olds, proficiency declined in the 1970s and improved during the 1980s, returning to approximately the same level as observed in 1973.

- **Reading.** For 9-year-olds, reading performance improved in the 1970s, declined in the 1980s, and by 1992, was at about the same level as the first assessment in 1971. Although there was little change in reading performance over time for 13-year-olds, over the 21 year period, average performance improved. For 17-year-olds, there were significant gains from 1971 to 1984, although reading performance has been flat since then.

- **Writing.** Assessed by grade level rather than age, there has been little change in writing performance between 1984 and 1992 for 4th and 11th graders. Fourth graders showed a decline in 1990, and an improvement in 1992. On the other hand, 8th graders showed a drop in performance between 1984 and 1990, with a significant improvement by 1992. The size of the 8th grade gain is so large that many are questioning the results, and NAEP officials are taking a wait-and-see approach and waiting for additional assessments to be completed before jumping to any conclusions.

To deal with [the] question, [Does money matter in education?], it is important to consider whether or not systematic links between educational resources and student outcomes can be found.

However one looks at these data, student performance in all four subject areas did not improve at the 22 percent rate of increase in spending during the 1970s, nor at the 48 percent increase of the 1980s.

There have also been a number of international comparisons of the performance of U.S. students with students in other countries. Stevens and Stigler (1992) compared the performance of students in Chicago and Minneapolis with similar aged students in Japan, Taiwan, and China. They show how poorly our students do compared to students in similar-sized cities in these countries. A number of other studies have shown children in the United States performing at lower levels than similar aged children in other countries.

These findings are somewhat controversial and highlight many of the difficulties involved in comparing student achievement across national borders. However, Bracey (1995) suggests that closer analysis of international test results shows that students in the United States do not do as poorly as we have been led to believe. He particularly points out that in the rankings of the Second International Assessment of Educational Progress, American 9-year-olds were ranked third in the world in science. Although the 14-year-olds were ranked 13th out of 15 nations, Bracey goes on to point out that in both cases the American students' scores were very close to the average of the entire sample, and that the outcomes by country were very closely bunched.

Despite the continued debate over the comparability of test scores over time in the United States, and across nations, it is clear that measures of student performance have not increased at the same rate as spending. In and of itself, this does not indicate that money does not matter. To deal with that question, it is important to consider whether or not systematic links between educational resources and student outcomes can be found. Before looking more closely at analyses of this complex question, it is helpful to consider the impact of educational spending on labor market outcomes.

- **Labor Market Outcomes.** It can be argued that an important outcome of schooling is the ability of graduates to find and keep good, high paying jobs. While making the link between educational resources and employment (as measured by lifetime earnings or a similar measure) is difficult, on the basis of national data, Card and Kruger (1990) found that men who were educated in states with relatively small classes in the public schools and relatively high teacher salaries tended to have higher earnings than did men educated in states with relatively larger classes and relatively lower paid teachers. Murnane (1991) suggests that Card and Kruger's findings might lead to the conclusion that small classes and high teacher salaries (both of which would lead to higher per pupil expenditures), may have a greater effect on future earnings than on standardized tests. Murnane points out that this research can also be challenged, and that there may be other factors leading to the correlation between small classes and highly paid teachers, and expresses concern that many studies do not consider how expenditure levels impact behavior of teachers and students. While more study will be required to answer this question definitively, it is clear that the long term impact of educational spending decisions as measured by labor market outcomes cannot be ignored any more than can the short term results provided by standardized tests.

The question that remains is whether or not a systematic link between resources and student outcomes, no matter how defined, can be found. The next section of this paper summarizes the research that has been done in this area.

Production Function Analyses: What Have We Learned So Far?

The analysis presented above leaves some doubt as to whether or not money really matters in improving education. This is, and continues to be, a matter of considerable debate today. Most of the research on this issue focuses on production function analyses that attempt to relate educational inputs to schooling outcomes. This section of the paper provides a brief description of production functions, and discusses their use in educational research. This is followed by an analysis of the current debate over what existing research tells us about the effect of resources on educational attainment.

Production Functions: Their Use in Education

A production function is a model that identifies the possible outcomes that can be achieved with a given combination of inputs. With knowledge of the quantities of inputs available, it is possible to calculate the maximum output that can be achieved. What is important to this process is how the inputs are translated into those outcomes, and finding the most efficient way of doing so. The difficulty with identifying production functions in education results from the complexity of the schooling process and the number of inputs that can impact the outcome. In addition, it is often difficult to reach agreement as to the desired outcomes of the educational system. Moreover, many of the factors that appear to have an impact on the educational production process may well be outside of the control of educators.

Production functions are estimated through statistical or econometric techniques that rely on regression methods to measure the relationship between a mix of inputs and some identified output. Among the most common outcomes used in studies of educational production functions are the results of standardized tests, graduation rates, dropout rates, and as discussed above, labor market outcomes. The inputs most often considered include per pupil expenditures, pupil/teacher ratios, teacher education, experience and salary, school facilities, and administrative inputs. Unfortunately, the results of studies that have attempted to measure the effects of these inputs often conflict or show inconclusive results. Others, beginning with the well known Coleman Report (Coleman et al. 1966), have shown that factors such as students' socio-economic status may be more important in determining how well they do in school than are many, if not all of the inputs listed above.

...factors such as students' socio-economic status may be more important in determining how well they do in school than... many...inputs...

Does Money Matter?: The Current Debate

While interest in the question of whether or not money matters has always been high, the publication of an article by Hedges, Laine, and Greenwald (1994) in the April 1994 *Education Researcher* has sparked a renewed debate over this issue. Prior to the publication of their article, the most often cited research in this field was the work of Eric Hanushek (1981, 1986, and 1989). In an analysis of data from 38 different articles and books containing 187 different regression equations, Hanushek focused on the effect of seven inputs to schooling. For each input, Hanushek analyzed the regression coefficients to determine if they were positive or negative, and whether the effect measured was statistically significant. He included a fifth category for those coefficients that were not statistically significant, and for which the sign on the coefficient could not be determined. His findings for each of the seven inputs are summarized.

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...despite the lack of statistically significant findings that lower pupil teacher ratios lead to improved school performance, there has been a dramatic effort to reduce class size...

- **Teacher/pupil ratio.** Hanushek found a total of 152 studies that considered the teacher/pupil ratio. While it is generally accepted that smaller classes lead to higher student achievement, of the 27 studies that had statistically significant findings, only 14 found that reducing the number of pupils per teacher was positively correlated to student outcomes, while 13 found the opposite effect. Moreover, of the 125 that did not have statistically significant results, 34 found a positive effect, 46 a negative effect, and the sign or direction of the effect could not be determined for the remaining 45 studies.

Interestingly, despite the lack of statistically significant findings that lower pupil/teacher ratios lead to improved school performance, there has been a dramatic effort to reduce class size across the nation in the last 20 years. A cursory review of the most recent edition of the *Digest of Education Statistics* (NCES 1994) shows that the average pupil/teacher ratio for K–12 public schools in the United States was 17.6:1 in 1994. Moreover, the data provided in the *Digest* suggest that this ratio has declined consistently since 1955 when it stood at 26.9 pupils per teacher (NCES, 1994, p. 74). In fact, except for an increase of 0.1 pupils per teacher between 1961 and 1962 and again between 1980 and 1981, and some minor increases in the 1990s from the low of 17.2:1 in 1989 and 1990, the average pupil/teacher ratio across the United States has declined in every year since 1955.

Picus (1993a) found that district level pupil/teacher ratios declined as expenditures per pupil and expenditures per pupil for instruction increased. However, as the percent of expenditures devoted to instruction increased, a similar pattern did not emerge. Since expenditure data were not available at the school level in the national data bases, Picus (1993b) compared school level pupil/teacher ratios with district per pupil expenditures. He found that at the elementary, intermediate, and secondary school levels, there is a trend toward lower pupil/teacher ratios as expenditures increase.

- **Teacher education.** In looking at teacher educational attainment, Hanushek found results similar to his findings for the pupil/teacher ratio. A total of 113 studies considered teacher education. Hanushek found that 8 of the 13 studies with statistically significant coefficients showed a positive effect of teacher education on student performance. The statistically insignificant studies were about evenly divided among positive, negative, and indeterminate findings.

- **Teacher experience.** Hanushek found more positive correlation between teacher experience and student performance. However, he indicated that these results only appeared strong in relation to the other findings, and that they could be the result of more experienced teachers being able to select teaching assignments with "good students." (Hanushek 1993).

- **Teacher salary.** Eleven of the 15 studies Hanushek identified with statistically significant results identified a positive relationship between teacher salaries and student performance. However, he argued that even this was not particularly strong evidence of a relationship given that teacher salaries are largely determined by teacher education and experience, and the underlying components of teacher salary were unrelated to student performance.

- **Per pupil expenditure.** It is also not surprising that Hanushek found per pupil expenditures did not play an important role in determining student performance. Specifically, he found that 13 of 16 studies with statistically significant results show a positive relationship. However, he discounted the importance of this arguing that 8 of the 13 came from one study which he felt did not measure family inputs precisely. As a result, Hanushek (1989) contends that school expenditures may have served as a proxy for family background in those studies.

- **Administrative inputs.** Monk (1989) points out that if there were not a production function in education, then the impact of any input would not matter to the outcome. Therefore, some amount of administration is essential to the operation of the educational system. Hanushek (1989) concluded that administrative inputs did not have a systematic relationship to student performance, even though seven of the eight studies with statistically significant findings showed a positive effect. Hanushek argued that variations in how administrative inputs are measured undermined the findings.

- **Facilities.** Adams (1994), Firestone et al. (1994), and Picus (1994b) show that when poor school districts in Kentucky, New Jersey, and Texas received substantial increases in funding as a result of school finance reforms in those states, a frequent response was to devote a substantial portion of those funds to facility improvements. This would imply that many educators believe the quality of school facilities are important to student learning. Yet Hanushek's (1989) analysis of facilities showed little relationship between the quality of school facilities and the performance of students.

After reviewing all 187 studies, Hanushek concluded that "There is no strong or systematic relationship between school expenditures and student performance." (Hanushek 1989, 47). These words have been cited often by those opposed to providing additional funds to the public schools. Opponents of increased funding argue that until educators can show more money will make a difference, additional funds should not be provided.

A recent review of these studies by Hedges, Laine, and Greenwald (1994) questions Hanushek's findings and suggests that money may in fact be more important in determining how well students are likely to do. Hedges, Laine, and Greenwald (1994) reviewed the same studies Hanushek considered in his analysis. They eliminated those studies that had insignificant results and the sign on the coefficient which could not be determined. They then analyzed the remaining studies which relied on statistical techniques other than the vote counting procedure used by Hanushek. They concluded that

> These analyses are persuasive in showing that, with the possible exception of facilities, there is evidence of statistically reliable relations between educational resource inputs and school outcomes, and that there is much more evidence of positive relations than of negative relations between resource inputs and outcomes. (Hedges, Laine, and Greeenwald 1994, 11)

While Hedges, Laine, and Greenwald (1994) found that expenditures do matter, they found less evidence of a relationship between the other factors identified above and

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[Ferguson's] findings...suggest that teachers' selection of districts in which they want to teach is affected by the education level of the adults in the community, the racial composition of that community, and the salaries in other districts and alternative occupations.

student performance. They suggest specific allocation of those resources may not be important in improving student performance in all situations. Further, they argue that local authorities should be given the discretion to spend funds as they think will best help the students for whom they are responsible.

Hedges, Laine, and Greenwald (1994) point out that if, for example, per pupil expenditures and student achievement were unrelated, half the studies would have positive coefficients and half negative coefficients. Moreover, they argue if there were no systematic relationship, only 5 percent of the studies would have statistically significant results. They then argue for the studies, where the direction of the coefficient could be determined, that a higher percentage of the coefficients showed a positive sign. In fact, the three authors argue this happened more often than would be expected by chance alone.

Hedges, Laine, and Greenwald also criticize the vote counting method used by Hanushek. They argue that as a procedure it has limited power in finding significant effects, and argue earlier work by Hedges and Olkin (1980) shows that as the number of studies reviewed increases, the probability that a vote count will correctly detect an effect decreases. Relying on a variety of analysis techniques, Hedges, Laine, and Greenwald (1994) re-analyzed Hanushek's study sample, and concluded that expenditures do have an impact on student achievement.

In a rejoinder, Hanushek (1994a) argues that the evidence still strongly indicates that there is no systematic relationship between how much money is spent and how well students perform. He asks, if money matters, but class size and teacher characteristics are not as important, what factors do in fact matter? Since teachers salaries and class size are the two largest determinants of spending, he suggests that if they are unimportant, other components of spending must be more effective in improving student performance. He suggests few would agree with the proposition that administration, another major component of school expenditures, is responsible for improving student performance.

In another study, Hanushek (1993) looked at the impact of spending on student performance in Alabama as measured by the percent of students passing standardized reading, mathematics, and language tests in the third, sixth, and ninth grades. Despite that fact that his analysis did not yield statistically significant results, he concluded that if his estimates were used and spending in each school district were increased to the level of the highest spending district in the state (some $5,113 per pupil, at a cost of $1.05 billion above the current spending of $2.4 billion), student performance would only be expected to improve by approximately 4 percent, at most. In one instance, grade 6 language performance, Hanushek actually predicted that the increased spending would reduce student performance by 0.2 percent.

These are not the only studies that have considered this question. A study by Ferguson (1991) looked at spending and the use of educational resources in Texas. He concluded that "hiring teachers with stronger literacy skills, hiring more teachers (when students-per-teacher exceed 18), retaining experienced teachers, and attracting more teachers with advanced training are all measures that produce higher test scores in exchange for more money." (485) His findings also suggest that teachers' selection of districts in which they want to teach is affected by the education level of the adults in the community, the racial composition of that community, and the salaries in other districts and alternative occupations. This implies, according to Ferguson, that better teachers will tend to move to districts with

higher socioeconomic characteristics if salaries are equal. If teacher skills and knowledge have an impact on student achievement (and Ferguson, as well as others suggest that it does) then low socio-economic areas may have to offer substantially higher salaries to teachers to attract and retain high quality instructors. This would help confirm a link between expenditures and student achievement.

One of the problems with all of these studies is they don't take into consideration the tremendous similarity with which school districts spend the resources available to them. As described above, research by Picus (1993a, 1993b, and 1994a) and Cooper (1993, 1994) has shown resource allocation patterns across school districts to be remarkably similar, despite differences in total per pupil spending, student characteristics, and district attributes. This does not mean that all children receive the same level of educational services. As Picus (1994a) points out, a district spending $10,000 per pupil and $6,000 per pupil for direct instruction is able to offer smaller classes, better paid, and presumably higher quality, teachers, and higher quality instructional materials than is a district spending $5,000 per pupil and only $3,000 per pupil for direct instruction.

What we don't know is what the impact on student performance would be if schools or school districts were to dramatically change the way they spend the resources available to them. In 1992, Odden and Picus suggested that the important message from the research summarized above was that, "if additional education revenues are spent in the same way as current education revenues, student performance increases are unlikely to emerge." (Odden and Picus 1992, 281). Therefore, knowing whether or not high performing schools utilize resources differently than other schools would be very helpful in resolving the debate over whether or not money matters.

Picus and Nakib (forthcoming) looked at the allocation of educational resources by high performing high schools in Florida and compared those allocation patterns with the way resources were used in the remaining high schools in that state. A total of seven different measures were used to compare student performance. In preliminary findings, Picus and Nakib show per pupil spending and per pupil spending for instruction was not statistically significantly higher in high performing high schools, largely because of the highly equalized school funding formula used in Florida. On the other hand, they found the percent of expenditures devoted to instruction was lower in the high performing high schools, implying high performing high schools may actually spend more money on resources not directly linked to instruction than do other high schools.

Unfortunately, the results of this Florida analysis do little to clarify the debate on whether or not money matters. Comparisons of high performing high schools with all other high schools in Florida did not show a clear distinction in either the amount of money available or in the way resources are used. As with many other studies, it was student demographic characteristics that had the greatest impact on student performance.

Conclusion

This paper has shown that despite considerable research on the matter, there is still a great deal of debate as to whether or not money makes a difference in education. Even though everyone agrees that high spending provides better opportunities for learning, and seemingly higher student achievement, statistical confirmation of that belief has been hard to develop. It is clear that over the past 30 to 35 years, there have been dramatic increases in real per pupil revenues for K–12 public education. Despite the substantial cumulative increase, the annual average increase has averaged only 2-

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3 percent. Consequently, educators and community school boards have had little opportunity to consider how they would use large increases in funding. As a result, educational resource allocation patterns are remarkably similar regardless of spending level.

A careful look at the research on the impact of money on student achievement shows that we may be asking the wrong question. Rather than consider whether or not additional resources will improve educational spending, it seems more important to ask how additional resources could be directed to improve student learning, or in Hanushek's (1994b) view, spend those resources more efficiently.

Although the growth in educational revenues was flat in the early part of the 1990s, as the nation's economy recovers from the recession, we are beginning to see increases in educational spending again. However, the mood of the public, while still generous toward education, has changed. Now they seem to be insisting that schools show dramatic improvements in exchange for continued support. To meet this responsibility to both the taxpayers and school children, more research is needed to see if there are substantial differences in the way high performing schools utilize their resources compared to other schools.

What seems evident today is that although aggregate analyses of school resource allocation patterns leads to the conclusion that schools look remarkably alike, the needs of the students within those schools are vastly different. The needs of poor, and often limited English speaking students in our inner cities, are considerably different from those of middle and upper class children in well-to-do suburbs across the nation. Therefore, it seems that if our schools are to succeed in the future, it is important to provide local educators with the resources and tools they need to meet the specific needs of the children they serve, and at the same time allow them to design programs that are specifically targeted to those children.

If we can move away from measuring school accountability through the way funds are used, and instead measure accountability in terms of student outcomes, the answer to the question posed in this paper will become unimportant. It won't be whether or not money matters, but how that money is used that matters.

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The Effect of Constitutional Litigation on Educational Finance: A Further Analysis

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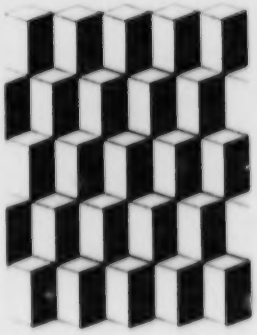

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Background and Prior Studies

The late Charles Scott Benson, testifying before a U.S. Senate Committee not long ago said, "You must be very careful when you wish for things because you may just get what you wish for. We worked hard for equity in California. We got it. Now we don't like it." Before Professor Benson made his sage observation, James Gordon Ward, in a seminal conceptual piece had noted that the goals of "equity" and "adequacy" might well be in conflict (1990).

Despite the timely warnings by Benson and Ward, however, 44 states have experienced litigation challenging the constitutionality of their K–12 finance systems. Appendix A is a current update of the status of those state constitutional challenges. For the last four years, the American Education Finance Association has conducted a pre-conference workshop for plaintiffs' lawyers in these school finance constitutional challenges. Every year, the filing of new complaints has been reported in that workshop. Obviously, a considerable number of people think that something can be gained by bringing these cases to court.

Six studies were used in the empirical quantitative research reported here. These either bore directly on the question of the effect of these constitutional challenges on school finance, or provided the necessary data for an investigation of that topic. The first study was by the senior author of this report and his colleagues at the Center for the Study of Education Finance, Illinois State University. Hickrod et al. (1992) used a twenty-year time span (1970–90). This research group found that winning the case at the state supreme court level had only a modest effect on increases in expenditure per pupil. However, winning at the state supreme court level brought about a meaningful shift in tax burden from local to state sources, while losing at the state supreme court level brought about the opposite effect—a shift from state to local resources. Winning the case was thus seen more as a means of property tax relief than as a prime determinate of more adequate funding. Winning also appeared to have little effect on fiscal effort for education. Using re-worked data from a study by James Wyckoff (1992), Hickrod et al. also concluded there was some evidence to

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support the hypothesis that winning, or winning and then filing compliance litigation, had the effect of reducing disparities between school districts. A disadvantage of the Wyckoff data was the limited time period, 1980 to 1987.

To date, the most sophisticated investigation of the question of the effect of judicial intervention is by Michael Heise (Fall, 1995). Heise used data from 1970 to 1992 to explore the effect of state supreme court decisions in two states, Wyoming and Connecticut. The study is multivariate in design and uses a dummy variable to represent the decision at one point in time. The research design is a single interrupted time series. Heise finds that in neither Wyoming nor Connecticut was the state supreme court decision statistically significant in increasing the expenditure per pupil of those states. Other factors in his multivariate equation played a greater role in increasing expenditure per pupil than did the court decision.

A study by Lauri Peternick (1995) used the longitudinal financial record of 12 states which had found their school finance systems to be unconstitutional (Arkansas, California, Connecticut, Kansas, Kentucky, Montana, New Jersey, Texas, Washington, West Virginia, Wisconsin, Wyoming). By comparing these states in which the system was adjudged unconstitutional with states in which the system was sustained, she sought evidence on the question of whether a decision was detrimental to increases in expenditure per pupil. While the Peternick study is not multivariate in nature, it is perhaps closer to the Benson-Ward notion that seeking the goal of equity might be detrimental to adequacy. Peternick's research did not support that notion. To the contrary, she found that the judicial interventions have stimulated growth in expenditure per pupil in those twelve states with successful litigation.

There is a major difference in the research designs of Heise and Peternick from that used by the Hickrod group at ISU. While Heise and Peternick sought to determine the effect of a decision at one point in time, the work at ISU assumes that the effect of decisions, note the plural, is cumulative over time. The Hickrod design is based on a notion that the litigation brings pressure upon the state legislature. How much pressure can be brought by the litigation on the state legislature? There is some evidence that the longer the court case is pursued, the more the pressure on the legislature builds. Winning, or winning followed by compliance litigation, puts the most pressure on the state legislature. Losing puts the least amount of pressure on the legislature, but losing and refiling at a later date on different legal grounds still applies some pressure on the state legislature. The Heise/Peternick approach is a single sharp action while the Hickrod approach is one of long term "climate" in a state. Neither design is wrong; they are just different.

In addition to these empirical studies, the work by Hertert (1994), Riddle (1994), and Moskowitz, provided essential calculations for the investigation reported here.[1] These calculations of the amount of disparity in each state, often measured as the coefficient of variation, have made a very valuable contribution to the study of educational finance. So much of the school finance data of the past has been based on individual state case studies that it has been difficult to mount generalizations which will hold over all 50 states. This is not to deprecate individual state case studies. Given the decentralized organization of school finance in

[1] Through the good offices of Stephanie Stullich, data from an unpublished study by Jay Moskowitz (commissioned by the U. S. Department of Education) was made available for the purpose of this investigation. Specifically, the coefficients of variation on state and local revenues per pupil for each state, 1980 and 1992, were used to compute percentage change in those coefficients. Since the most important findings in this report hinge upon the changes in those coefficients, the authors are properly appreciative of the efforts of both Stullich and Moskowitz.

the United States, those individual state case studies will continue to play an important policy role in American school finance (Hickrod et al.).

Empirical Section

As in the previously reported study, the investigators assumed that the six categories of states pictured in Figure 1 constituted the six different "climates" in which school finance fiscal policy changes have taken place. The first eight states of Category I are those in which plaintiffs have won a clear judicial victory. In these states, it was assumed that the pressure on the legislature would be at the greatest level. The six states of Category II also constitute those in which judicial activity would have put great pressure on the legislatures. In these states, there has been a clear judicial victory for the plaintiffs, but the plaintiffs have been unhappy with the actions of the state legislature and have sought additional relief from the courts. The 11 states of Category III should exert less pressure on the legislatures since in those states the defendant (the state) won and no further complaint has been filed, or, if a further complaint has been filed, that complaint also lost. Less pressure should also be found in Category IV, although these six states constitute something of an enigma. They are states in which a previous effort at litigation has lost and yet plaintiffs have had the perseverance and stamina to file again on a different legal theory and perhaps even file a second or third major challenge. Thus, Category IV might indicate more pressure than Category III.

In the ten states in Category V, there should be less pressure on the state legislature since no state supreme court ruling has yet taken place. There have been middle level court decisions in some of these states, in addition to lower court decisions. In some of these states most of the action has been on a motion to dismiss by the state, with no trial on the merits having yet been held. It would seem that the pressure on the legislature brought about by an actual trial on the merits could be an important part of the determinants of fiscal policy which this study wanted to investigate. A trial of several weeks, with its attendant press coverage, might well generate actions in the legislature that nothing else could bring about. Finally, Category VI states surely constitute the least pressure on the legislature. In fact, in six of these nine states there has been no litigation at all and in the other four states there has been a history of litigation but the case is presently dormant.

It would seem that the pressure on the legislature brought about by an actual trial on the merits could be an important part of the determinants of fiscal policy...

It will be obvious to those familiar with this body of litigation that this "climate" system is far from perfect. Assigning a state like Kansas, where there has been a good deal of litigation activity, to Category VI is especially doubtful. Also assuming that the action at the lower court level in Alabama was equal to the actions in the lower and middle level courts of Illinois is unfounded. Neither is there a comparison between these two states with a very unusual supreme court action in Missouri. It may also be difficult for plaintiff lawyers to accept that the decision in North Dakota was actually a loss. However, even though the categories demonstrate some heterogeneity within class, the categories are sufficiently distinct to be useful for analysis. Both the previously reported work and the work reported here confirm that belief.

The first evidence is in Table 1 which takes four fiscal variables at one point in time and categorizes them by the six state "climates." This is probably the weakest of the evidence reported here since many variables other than court decisions could and do affect the magnitude of these four fiscal variables. Nevertheless, there are some interesting possibilities. The highest expenditure levels are found in Categories II and IV. Repeated litigation is found in both of these categories. In Category II there has been a win and then further litigation. In Category IV there has

Figure 1.—Status of School Finance Constitutional Litigation

I Plaintiffs won at the state supreme court level. (8 states)

II Plaintiffs won at the state supreme court level, but further compliance litigation was filed. (6 states)

III Plaintiffs lost at the state supreme court level and there has been no further complaint filed or lost. (11 states)

IV Plaintiffs lost at the state supreme court level, but there have been further complaints filed. (6 states)

V Litigation was present, but no supreme court decision has been rendered. (10 states)

VI No litigation is present or case is dormant. (9 states)

SOURCE: Center for the Study of Educational Finance, Illinois State University, Normal, Illinois.

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Table 1.—Means of selected fiscal variables, by legal category

Fiscal Variables	Category I	II	III	IV	V	VI
Expenditure Per Pupil (1993)	$5,463	$5,620	$5,000	$5,759	$5,034	$4,853
Coefficient of Variation (1990)	19.32	18.98	18.76	19.60	20.70	15.36
Fiscal Effort (1993)	0.2572	0.2834	0.2529	0.2739	0.2584	0.2512
Percentage State Aid (1990)	44.84	54.33	39.69	47.03	50.10	54.57

NOTE: Category I: plaintiffs won. Category II: plaintiffs won, further litigation filed. Category III: plaintiffs lost, no further litigation filed. Category IV: plaintiffs lost, further litigation filed. Category V: no court decision. Category VI: no litigation present.

SOURCE: Derived from Common Core of Data, Fiscal F-33 Collection, U.S. Department of Education, National Center for Education Statistics, Washington, DC.

states in which there have been winning supreme court decisions have a greater percentage increase [in funding] than any other legal category.

been a loss and then further litigation. The lowest expenditure levels are found in the states that have experienced no litigation or where the litigation is dormant.

With regard to the crucial matter of disparity between districts (Table 1, coefficient of variation), at first there does not appear to have been much effect caused by court activity since the disparity for the winning states is actually greater than the disparity in the losing states. However, this picture greatly changes when the focus becomes change through time which is the subject of Table 2. In Table 1, fiscal effort, defined as the ratio of expenditure per pupil to income per capita as of 1993, also does not seem to have been effected much by court decisions. Percentage of state aid is high for Category II (winning plus additional compliance litigation), but it is also high for Category VI which has little litigation activity. Again, this is clarified by Table 2.

The evidence of Table 2 is more substantial. Here are arrayed the same four fiscal variables, but now the focus is on change through time in these four variables. States in which there have been winning supreme court decisions have a greater percentage increase than any other legal category. This finding would support the Peternick results. However, since no controls are effected here for other variables that are changing through time, as in the Heise study, one cannot be sure the increase in funding observed is due entirely to the court decision(s). The change in disparity between school districts within a state is much more prominent than is the increase in expenditure per pupil. Here Category I (winning) states have clear reductions in disparity between school districts and there is also a reduction in disparity in Category II states (win but with further compliance litigation). By contrast, Category III states (losing states) show no decease in disparity between school districts and Category IV states (loss but with further litigation) show striking increases in disparity among school districts. This makes some practical sense. It is quite likely that the increasingly disparate situations in Ohio, Pennsylvania, and New York have driven the equity proponents in those states back into additional litigation, despite some early losses in that arena.

Differences in changes in fiscal effort are not remarkable except that it is interesting to note that increases in fiscal effort are lowest in Category VI, the category with the least legal activity. With respect to change in

Reducing disparity requires a greater and greater reliance on the state, rather than the local unit of government, to support education.

Table 2.—Change in means of selected fiscal variables, by legal category

Fiscal Variables	Category I	II	III	IV	V	VI
Percentage Change of Expenditure Per Pupil (1978–1993)	$279	$255	$233	$259	$232	$236
Percentage Change of Coefficient of Variation (1980–1990)	-22.14	-7.54	2.44	22.51	6.15	-5.73
Percentage Change of Fiscal Effort (1980–1990)	1.37	1.4	1.34	1.45	1.37	1.23
Change of Percentage State Aid (1970–1990)	3.44	19.25	5.36	1.73	5.69	7.14

NOTE: Category I: plaintiffs won. Category II: plaintiffs won, further litigation filed. Category III: plaintiffs lost, no further litigation filed. Category IV: plaintiffs lost, further litigation filed. Category V: no court decision. Category VI: no litigation present.

SOURCE: Derived from Common Core of Data, Fiscal F-33 Collection, U.S. Department of Education, National Center for Education Statistics, Washington, DC.

percentage of state aid provided to local school districts, it is apparent that very large increases in state aid occurred in Category II states (plaintiff won and then filed compliance litigation after the win). This suggests winning the lawsuit may bring about tax relief to property taxpayers, a point made in the ISU Center's original investigation.

From the data assembled here, it is possible to erect a test of the Benson/Ward hypothesis, at least a partial test. Essentially, the warning sounded by both Benson and Ward is that, if the state puts all of its efforts into reducing disparity between school districts, then the overall state/local funding level of the state for public education could either fall over time or remain static over time. This could come about in several ways. Reducing disparity requires a greater and greater reliance on the state, rather than the local unit of government, to support education. If the state government shoulders this responsibility, fine. However, in many states the legislature has been reluctant to put more funds into public education, or cannot put more funds into public education due to the increasing competition for those funds from functions such as Medicaid and various welfare programs. Should the federal government push more of these medical and welfare programs back to the state level, then state funds would be in even shorter supply for educational programs. It might be even more difficult for the state to assume the responsibility once held by the local school district. It is also possible that the "balkanization" of the state legislatures could lead to even more "gridlock" between wealthy and poor parts of the state with the result that no legislation is able to be passed to increase funding for the schools.

This is a rather pessimistic hypothesis, and essentially assumes that one cannot make gains on both "adequacy" and "equity" at the same time. To explore this hypothesis percentage change in expenditure per pupil (1978–1993) was regressed upon percentage change in the coefficient of variation of expenditures per pupil within the several states. This last dimension is a little confusing since there are negative percentage

changes (reductions in disparity) at the lower end of the scale and positive percentage changes (increases in disparity) at the upper end of the scale. For the Benson/Ward hypothesis to hold, one would need to find a positive relationship between the two variables. That is, low increases in expenditure per pupil would need to be related to reductions in disparity and high increases would need to be related to increases in disparity. However, the data we have indicates not a positive, but rather a negative relationship. High increases in expenditure per pupil are related to reductions in disparity and low increases in expenditure per pupil are related to increases in disparity between school districts. Granted the relationship is not strong, being merely a Pearson product-moment correlation of - .15. A more cautious finding might be that no significant relationship exists between the "adequacy" goal, (increasing expenditures) and the "equity" goal (decreasing disparity). Since they do not seem to be related, "adequacy" and "equity" may well have different determinants.

Figures 2 and 3 constitute a Chi Square test of the significance of the state supreme court decisions. In Figure 2 winning and losing decisions are arrayed against high and low increases in percentage change in expenditure per pupil. There appears to be little effect of the decisions upon the percentage change in expenditure per pupil. The contingency coefficient is only .12 and not statistically significant. By contrast, when the winning and losing decisions are arrayed against decreases in disparity or, at best, small increases in disparity and large increases in disparity, there is an easily ascertained relationship. Winning decisions are associated with reduction of disparity and losing decisions are associated with increasing disparity. The relationship as stated by the contingency coefficient is .38 which is significant at the .02 level. Thus, the evidence in this study supports the notion that the state supreme court decisions help to reduce expenditure disparity between school districts within states, but are not necessarily related to increases in average expenditures per pupil in those states.

Anecdotal Evidence

In addition to the statistical analysis, anecdotal evidence was gathered to shed more light on the claim that litigation has been effective in obtaining increased financial support for a state's schools. To be included in this part of the study, a state needed to meet two criteria. First, it needed to be one of the 14 states in Categories I and II on the status report (Appendix A). Since the data analysis included the 1990s, it was decided that, with the passage of time, intervening conditions might have adversely affected the earlier gains, so the survey should be directed toward the more recent cases, thereby eliminating California (1977), Connecticut (1977), Washington (1978), and Wyoming (1980). The second criterion was that the statistical analysis gave evidence of either an increase in per pupil spending, a reduction in disparities between school districts, or both conditions. Table 3 lists the rankings among the 11 states in which anecdotal materials were collected.

Since the data placed Connecticut among the highest on both criteria, it was included in the interviews. The influence of the landmark decisions in California are reflected in the later cases in the analysis, so a brief comment about *Serrano* is included.

CALIFORNIA: The impact of *Serrano v. Priest* (1971) in the early 1970s has had a profound effect upon school funding systems in many states besides California. During the so-called "first wave" of litigation, even states which did not have lawsuits pending were awakened to the fact that their finance systems might be in jeopardy and there was an upsurge of reform. The *Serrano* dicta (which essentially stated that educational funding was a function of the wealth of the state, not the wealth of a district) became an

...state supreme court decisions help to reduce expenditure disparity between school districts within states, but are not necessarily related to increases in average expenditures per pupil in those states.

Figure 2.—Win or loss at supreme court level and percentage change in expenditure per pupil (1978–1993)

		Percentage Change in Expenditure Per Pupil		
	Count Exp Val	High Increase	Low Increase	Row Total
Legal Categories	Won	6 5.1	8 8.9	14 46.7%
	Lost	5 5.9	11 10.1	16 53.3%
	Column Total	11 36.7%	19 63.3%	30 100.0%

Statistic	Value	Approximate Significance
Contingency Coefficient	0.11931	0.51643 *

* Pearson chi-square probability

SOURCE: Derived from Common Core of Data, Fiscal F-33 Collection, U.S. Department of Education, National Center for Education Statistics, Washington, DC

Figure 3.—Win or loss at supreme court level and percentage change in coefficient of variation

		Percentage Change in Coefficient of Variation		
	Count Exp Val	Decrease or Low Increase	Large Increase	Row Total
Legal Categories	Won	11 7.9	3 6.1	14 46.7%
	Lost	6 9.1	10 6.9	16 53.3%
	Column Total	17 56.7%	13 43.3%	30 100.0%

Statistic	Value	Approximate Significance
Contingency Coefficient	0.38211	0.02353 *

* Pearson chi-square probability

SOURCE: Derived from Common Core of Data, Fiscal F-33 Collection, U.S. Department of Education, National Center for Education Statistics, Washington, DC

Table 3 -- Rankings for 11 states on which anecdotal materials were collected

State	Reduction in Disparity[1]	Rank	Increased Expenditure Per Pupil[2]	Rank
Arizona	-23.81	*	149.23	10
Arkansas	-5.88	9	219.78	8
Connecticut	-36.84	3	300.32	6
Kentucky	-44.44	1	343.46	5
Massachusetts	-4.55	9	219.33	9
Montana	-25.00	6	172.25	11
New Hampshire	-26.09	5	609.60	1
New Jersey	-23.81	*	548.15	3
Tennessee	11.11	10	253.66	*
Texas	-39.13	2	326.86	4
West Virginia	-30.77	4	384.25	2

NOTE: Arizona and New Jersey are both ranked *.

[1] A negative number indicates a decrease in disparity. The higher the number, the smaller the disparity.

[2] The higher the number, the greater the increase in expenditure per pupil from 1970 to 1990.

important part of many plaintiffs' cases. In the earliest suits, however, the judiciary played a less active role in developing guidelines or deadlines which were incumbent upon the legislatures.

ARKANSAS. In the fall of 1994, the court declared the state's school-funding formula unconstitutional and the legislature was given two years to correct it. Based on past experience, some feared that, without more guidance from the court, inequities would not be remedied. After the finance system was ruled unconstitutional in 1978, the legislature enacted revisions to the state's complex formula. Despite these changes, financial disparities actually rose between 1979 and 1993. In the more recent decision, the court was more directive in expanding its rulings.

ARIZONA. A headline in *Education Week* stated, "Judge orders lawmakers to fix Arizona finance system." The reliance on property tax to pay for education was found to be unconstitutional because it produces disparities, especially in the qualities of school facilities. Several remedies have been suggested, but the finance issue was delayed until the 1995 session of the legislature.

CONNECTICUT. The threat of litigation in other states in the early 1970s may have caused the legislature to "start the ball rolling" on school finance reform, but the supreme court decision in *Horton v. Meskill* (1977) brought it to a climax. The flat grant system was dropped and an equalization formula was instituted. The formula took into account the personal incomes of the various communities and targeted money toward those where the need was greatest, thereby decreasing the disparity between districts. The strong economy of the state in the 1980s fostered increased funding. When the economy "took a nose dive" in the early 1990s, the legislature was committed to increased funding. A personal income tax was enacted, the sales taxes were increased, but the property taxes remained about the same. The command strong support, in spite of an economic slump, might be attributed to the somewhat unique political climate in this state which has been described as its "consensual nature of politics."

KENTUCKY. The Kentucky Education Reform Act has been called the "national model of school reform." The decision in Kentucky was the beginning of a trend in which courts began playing a more prominent role in school finance litigation and legisla-

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Of the states surveyed, Kentucky ranks first on reduction of disparities and among the highest in increases in per pupil expenditures.

tive solutions. As a result of the court's findings, a new formula was established. Each district was guaranteed a specified minimum amount of money per pupil. State funding was provided for mandated programs. Local districts must contribute a fair share by taxing at a specified minimum rate and may raise additional funds, with matching state funds provided in some situations. While those elements of the reform which deal with other than fiscal matters are still debated, there is no question that the funding increased. Of the states surveyed, Kentucky ranks first on reduction of disparities and among the highest in increases in per pupil expenditures.

MASSACHUSETTS. The Supreme Court's ruling emphasized that the state has primary responsibility for education. The education reform plan sets a foundation level which is to be reached by the year 2000. The state will play a greater role in making up for differences between wealthy and poor districts and the state has specified a minimum amount that local governments must appropriate to participate in the state's education funding system.

MONTANA. In 1989, the Supreme Court found, among other things, that the funding system was forcing an over reliance on property tax levies. The legislature responded by reworking the funding system, but it was also found to be unsatisfactory. During the 1993 session, a radically revised finance system was enacted. It provides for an "optimum" funding level and requires all districts to spend between 80 percent and 100 percent of that level. To meet this requirement, some districts are restricted from spending more than the standard and some districts will be forced to increase property taxes.

NEW HAMPSHIRE. Historically, the state's role in education has been limited. The court ruled that education is a state function. While there have been proposals to increase the level of state support, the legislature has been slow to respond in part because the state has no sales or income taxes and the political climate is un-supportive of enacting new taxes. One possible option is to collect and distribute some property taxes on a statewide basis. The court remanded the tax equity question to the trial court.

NEW JERSEY. Repeatedly, the Supreme Court has ordered the legislature to remedy the inequities among its school districts. This failure to implement a funding reform reflects the "complexity and political contentiousness of school finance in New Jersey, where the issue has long preoccupied state lawmakers and judges." (*Education Week*, April 6, 1994). In 1990, the finance system was ruled unconstitutional for the third time. This time, the court specified that the legislature must make substantial equalizations in per pupil spending by the 1997-98 school year.

TENNESSEE. The court provided general guidelines and left the details to the legislature. The Basic Education Program and a half cent sales tax increase were enacted in 1992. There has been a scheduled increase of 11 to 16 percent in overall state funding which will be phased in over a period of six years. The formula requires little additional effort from local governments however many local governments have increased their support. The reduced disparity between high and low spending districts has been noticeable, but the major declines in disparity will occur in the next three years. (Data do not show this, probably because the effects of the suit are more recent than the data used.)

TEXAS. Texas has seen tremendous equity gains in the past five years. Most of the gains have been achieved through "leveling down." The court decisions of 1989, 1991, and 1992 did not mandate an increase in state funding. Texas' total state

the Edgewood v. Kirby decision, there has been an increase in school funding, but the source of this has come largely from local revenues. The school finance formula was revised and increased tax effort and increased the required local share tax rate. The local revenues are shared with other school districts to redistribute the state aid.

WEST VIRGINIA. The decision in the 1980s has been hailed as a revolutionary step to end ending funding disparities (*Education Week*, Feb. 15, 1995). Unlike some of the earlier cases in other states, the court was very specific about the task of the legislature. As the preceding data indicate, great strides were taken to provide an equitable and adequate education, but the legislature was unable to sustain these strong beginnings. Therefore, new compliance legislation was filed in 1994.

SUMMARY. These gleanings from the media and from telephone interviews with knowledgeable persons in the states hint at the shortcomings of those who have followed activities in the state legislatures. Mary Falkner (1996), Policy Analyst of the Education Commission of the States, has stated that "I can play a bigger role in finance by an article of that title, she says that in more recent cases, "courts now are taking a deep interest in the problems with and solutions to school finance. In addition, many court decisions are prescribing state leaders with 'recommendations' for revamping funding systems. If courts are sending legislatures back to the drawing table and plaintiffs are telling lawsuits until acceptable solutions are presented."

Some Unanswered Questions

Every empirically based piece of research raises more questions than it answers, and this is no exception. It was known before beginning this effort that some states of Arkansas had reduced their disparities between school districts dramatically in recent years. It was also known that some states (Illinois) had experienced great increases in those disparities. In this and related research, it has been established, at least to some degree of satisfaction, that the constitutional litigation is one factor in explaining these differences between states. Not a basis is put forth, however, that the constitutional litigation is the only factor operating to distinguish between states with regard to educational disparities. With the notable exception of the Minnesota study, there is simply not enough longitudinal research on disparities within states to draw firm conclusions.

Logically, one knows that economic development within states is not uniform; some states have experienced much more unequal economic development than have other states. This is a complicated subject that takes one rather far outside the world of school finance and into urban and regional economics. If educational researchers wish to follow the inquiry trail down to its very source, that is the direction in which they will have to head their expedition.

Neither is it known to what extent large multi-state corporations operating throughout the entire country have influenced these long term trends in disparities between school districts. A seminal study by the Twentieth Century Fund, *Edward Wolff's Top Shares: A Study of Increasing Inequality of Wealth in America* (1995), reveals the disturbing fact that wealth concentrations are now nearly twice as great in the United States as they are in Great Britain – exactly reversing a situation that held before World War II. Wolff's study supports other evidence of income inequalities that have grown rapidly in the United States since roughly 1970. What the connections are between these large national trends toward greater income and wealth inequality and school finance is unknown. Very likely, this relationship will remain unknown as long as school finance research continues to be as parochial as it has been in the past. Hope-

fully, the Twentieth Century Fund or some other private foundation will become sufficiently interested to explore these matters. It does not appear likely at the moment that the federal government will be willing to follow this research lead.

Conclusion and Policy Implications

In a world challenging the system of funding K-12 education through the courts' (its purely empirical grounds, the answer is probably yes). The weight of the evidence provided in this study certainly suggests that progress can be made in reducing expenditure disparities between school districts by court action. Much less certain is the evidence that increases in funding for all school districts can be engineered, that is, that adequacy as well as equity is served by this type of litigation. In some states, Kentucky and Tennessee come immediately to mind, progress can perhaps be made on both goals, equity and adequacy. In the longterm many in other states, only one or the other of the goals may be served.

However, before rushing to the court house with constitutional complaint firmly in hand, there are a number of very sobering considerations to keep in mind. In the first place, this legal process can take a very long time and can be quite expensive. It is not at all unusual for this litigation to last a full decade and take well over a million dollars in legal fees in any given state. Further, the chances of losing the case are quite high. To present, 27 states have successfully defended their systems against constitutional challenges and more will likely do so in the future. Traditions of court deference to legislative bodies in this area are quite strong in a number of states. What must be considered especially carefully is the effect of an adverse ruling. While evidence of beneficial effects of a ruling for the plaintiffs is present, the effects of a strong ruling for the defendants is not as well known.

Reading recent briefs of attorneys general from around the country reveals a strong pattern in defense strategy that also needs to be taken into consideration by plaintiffs. If case precedent is poor for plaintiffs, and it is in many states, it is always a certainty that plaintiffs will have a motion to dismiss based upon prior cases which give great presumption of legitimacy to the legislature's findings in these areas of public policy. This will mean a long struggle all the way up the ladder of judicial review to even get into court with the evidence. A trial on the merits -- on the facts, that is -- will often have to be solely won in the courts since this is not given as a matter of right. Even if a trial on the facts takes place, it is always a certainty that defense will argue that the current foundation level provides a reasonably adequate education therefore any amount of disparity above the foundation level is irrelevant. The state will argue that if the poorest funded school district in the state is adequately funded, then no one's constitutional rights have been harmed. It may even be admitted, very grudgingly by the state, that education can might be a fundamental right under the constitution, but it is a right only to enter the playing field; it does not guarantee a right to a level playing field.

In fact, the constitution may require the state to provide an education which is adequate to meet the needs of basic participation in the mainstream's governmental processes of the state. The individual has a right that is only to the minimum education necessary to be a good citizen. Plaintiff then faces the tough challenge of showing that education at the foundation level is not adequate for voting, freedom of speech, etc. It is very difficult for a court of law to determine just how much funds is the point to which a reasonably prepared citizen who are capable of exercising their civil rights.

So we ask again, is it worth fighting all these court and spending all that money? We

...it may be necessary to expand spending on education...to restrict spending in other governmental functions.

that particular line of argument, but conservatives are not at all left out in this doctrine. For conservatives, education is the source of an individual's ability to restrict the size and effect of government, because, without an adequate education, the individual citizen cannot effectively defend his or her liberties against the incursions of the state. Ultimately, the conservative sides with Jefferson who said, "a nation that expects to be ignorant and free asks what never was, and never will be." Paradoxically, it may be necessary to actually expand spending on education in order to restrict spending in other governmental functions. "Mr. Republican," the late Senator Robert Taft, used that argument in defending many of his pro-education spending votes in the U.S. Senate.

Educators often view the world through a very narrow lens. This constitutional litigation will continue because it swells up from the magma of this society, from public policy problems never solved from the very opening days of this Republic. Viewed in this light, the constitutional challenges are serving a very useful function. Just like volcanoes, they relieve the pressure beneath the surface that would otherwise tear the Republic apart. We should be thankful for them.

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APPENDIX A

STATUS OF SCHOOL FINANCE CONSTITUTIONAL LITIGATION

Compiled by G. Alan Hickrod, Robert Lenz, and Paul Minorini

June 1995

I. Plaintiffs won at the state supreme court level (8 states):

Washington	*Seattle v. Washington*, 1978
Kentucky	*Rose v. The Council*, 1989
Connecticut	*Horton v. Meskill*, 1977;
	Sheff v. O'Neill, 1995
Tennessee	*Tennessee Small School Systems v. McWherter*, 1993, 1995
Massachusetts	*McDuffy v. Secretary of Education*, 1993
Arizona	*Roosevelt Elem. School Dist. 66 v. Bishop*, 1994
Texas	*Edgewood v. Kirby*, 1989, 1990, 1991, 1992, 1995
New Hampshire[1]	*Claremont, New Hampshire v. Gregg*, 1991

II. Plaintiffs won at the state supreme court level, but further compliance litigation was filed (6 states):

California	*Serrano v. Priest*, 1971, 1977
Wyoming	*Washakie v. Hershler*, 1980
West Virginia	*Pauley v. Kelly*, 1979; 1988
	Pauley v. Gainer, 1994
Montana	*Helena School District v. Montana*, 1989, 1993
	Montana Rural Ed Assoc. v. Montana, 1993
New Jersey	*Robinson v. Cahill*, 1973;
	Abbott v. Burke, 1985, 1990, 1994
Arkansas	*Dupree v. Alma School District*, 1983;
	Lake View v. Arkansas, 1994

III. Plaintiffs lost at the supreme court level and there have been no further complaint filed or lost (11 states):

Michigan	*Milliken v. Green*, 1973
	East Jackson Public School v. State, 1984
Idaho	*Thompson v. Engelking*, 1975;
	Frazier et al. v. Idaho, 1980
Georgia	*McDaniels v. Thomas*, 1981
Colorado	*Lujan v. State Board of Education*, 1982
Wisconsin	*Kukor v. Grover*, 1989
Oregon	*Olsen v. Oregon*, 1979;
	Coalition for Ed. Equity v. Oregon, 1991
Minnesota	*Skeen v. Minnesota*, 1993

[illegible] state found constitutional on latest supreme court decision.
[illegible] suit plaintiffs at appeals on motion to dismiss.

North Dakota	*Bismark Public Schools v. North Dakota*, 1993[3]
Nebraska	*Gould v. Orr*, 1993
Virginia	*Alleghany Highlands v. Virginia*, 1991 (Withdrawn 1991)
	Scott v. Virginia, 1994
Maine	*M.S.A.D #1 v. Leo Martin*, 1992, 1995

IV. Plaintiffs lost at the supreme court level, but there have been further complaints filed (6 states):

Pennsylvania	*Danson v. Casey*, 1979, 1987
	Pennsylvania Association of Rural and Small Schools v. Casey, 1991;
Ohio	*Board of Education v. Walter*, 1979
	Howard v. Walter, 1991
	Thompson v. State of Ohio, 1991
	DeRolph v. State, 1992.
New York[3]	*Board of Education v. Nyquist*, 1982; 1987
	Reform Educational Financing Inequities Today (R.E.F.I.T.) v. Cuomo, 1991
	Campaign for Fiscal Equity v. State of New York, 1993
Maryland	*Hornbeck v. Somerset County*, 1983
	Bradford v. Maryland State Board of Education, 1994
South Carolina	*Richland v. Campbell*, 1988
	Lee County v. Carolina, 1993
North Carolina[3]	*Britt v. State Board*, 1987
	Leandro v. State, 1994

V. Litigation was present, but no supreme court decision has been rendered (10 states):

Illinois[3]	*The Committee v. Edgar*, 1990
Alabama	*Alabama Coalition for Equity v. Hunt*, 1990;
	Harper v. Hunt, 1991
Alaska	*Matanuska-Susitna Borough v. Alaska*, 1989
South Dakota	*Seddelbeck v. South Dakota*, 1991
Rhode Island	*City of Pawtucket v. Sundlun*, 1992
Missouri	*The Committee v. Missouri* and
	Lee's Summit P.S.U. v. Missouri, 1994[3]
Louisiana	*Charlet v. Legislature of State of Louisiana*, 1992
Florida[3]	*Coalition v. Childs*, 1995
New Mexico	*Zamagordo v. Morgan*, 1995
Vermont	*Lamoille County v. State of Vermont*, 1995

Majority (3) ruled in favor of plaintiffs, but North Dakota legislature later overturned statutory law, rendering decision moot.
3/4 for defendants at appeal on motion to dismiss.
3/4 for plaintiffs at district on merits.
3/4 for defendants at district on motion to dismiss.
3/4 for plaintiffs at district on motion to dismiss.
3/4 for defendants at district on merits.
After a trial on the merits, the trial court rendered a decision for the plaintiffs, but reserved many issues for a later hearing.
The defendants appealed the trial court's decision, and on June 23, 1994, the Missouri Supreme Court dismissed that appeal on the grounds that the judgement below was not final.

VI. No litigation is present or case is dormant (9 states)

Delaware	Mississippi
Hawaii	Nevada
Iowa	Utah
Indiana	*Lake Central v. Indiana*, 1987 (Withdrawn)
Oklahoma	*Fair School v. State*, 1987
Kansas	Consolidated
	Unified School District 229, et al. v. State, 1992
	Unified School Dist 244, Coffey County, et al v. State
	Unified School District 217, Rolla, et al. v State

Category A: States in which the state supreme court has declared that education is a fundamental constitutional right (13 states)

Arizona	*Shofstall v. Hollins*, 1973
Wisconsin	*Buse v. Smith*, 1976
California	*Serrano v. Priest*, 1977
Connecticut	*Horton v. Meskill*, 1977
Washington	*Seattle v. Washington*, 1978
Wyoming	*Washakie v. Hershler*, 1980
West Virginia	*Pauley v. Bailey*, 1984
Montana	*Helena v. State*, 1989
Kentucky*	*Rose v. the Council*, 1989
Minnesota	*Skeen v. Minnesota*, 1993
Massachusetts	*McDuffy v. Secretary of Education*, 1993
Tennessee	*Tennessee Small School Systems v. McWherter*, 1993
Virginia	*Scott v. Virginia*, 1994

Category B: States in which the state supreme court has declared that education is NOT a fundamental constitutional right (10 states)

New Jersey	*Robinson v. Cahill*, 1973
Michigan	*Milliken v. Green*, 1973
Idaho	*Thompson v. Engelking*, 1975
Oregon	*Olsen v. State*, 1976
Pennsylvania	*Danson v. Casey*, 1979
Ohio	*Board v. Walter*, 1979
New York	*Levittown v. Nyquist*, 1982
Colorado	*Lujan v. Colorado*, 1982
Georgia	*McDaniel v. Thomas*, 1982
Arkansas	*Dupree v. Alma*, 1983

Category C: Lower court decision on education as a fundamental right

1. States in which a circuit or appellate court has declared that education IS a fundamental right (7 states):

Alabama	*Alabama Coalition for Equity v. Hunt*, 1990
Missouri	*Committee v. Missouri*, 1993
Minnesota	*Skeen v. Minnesota*, 1992
North Dakota	*Bismark Public Schools v. North Dakota*, 1993
Washington	*Tronsen v. State of Washington*, 1991
Ohio	*DeRolph v. State*, 1992.
Rhode Island	*City of Pawtucket v. Sundlun*, 1992

2. States in which a circuit or appellate court has declared that education IS NOT a fundamental right (2 states):

Illinois	*Committee v. Edgar*, 1992
New Hampshire	*Claremont, New Hampshire v. Gregg*, 1991

Student-Level School Resource Measures

Robert Berne and Leanna Stiefel
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New York University

About the Authors

Robert Berne is Vice President for Academic Development at New York University, where he has been a faculty member since 1976.

He is the co-author of *The Measurement of Equity in School Finance* (Johns Hopkins University Press, 1984) and the co-editor of *Outcome Equity in Education* (Corwin Press, 1994). In the field of public sector financial management, he has co-authored *The Financial Analysis of Governments* (Prentice Hall, 1986) and authored *The Relationships between Financial Reporting and the Measurement of Financial Condition* (Governmental Accounting Standards Board, 1992). In addition, he has published work in numerous journals and testified in school finance court cases.

Dr. Berne served as executive director of the New York State Temporary Commission on New York City School Governance, also known as the Marchi Commission, from 1989 to 1991 and was the director of policy research for New York State's Temporary Commission on the Distribution of School Aid (Salerno Commission) in 1988.

Dr. Berne helped to develop, and is the chairman of, the Steering Committee of the Soros Foundation-funded Institute for Local Government and Public Service. The Institute, located in Budapest, Hungary, supports the fields of local government and governance by assisting organizations in Central and Eastern Europe.

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In her education finance research, she focuses on the equity of state and intra-district level finance systems, the efficiency of school level allocations and budgeting, and public finance issues in K-12 education. She is author of *Statistical Analysis for Public and Nonprofit Managers* (Praeger, 1990), co-author of *The Measurement of Equity in School Finance* (Johns Hopkins University Press, 1984) and writes frequently for journals such as the *Journal of Education Finance*, *Educational Evaluation and Policy Analysis*, and *Journal of Policy Analysis and Management*.

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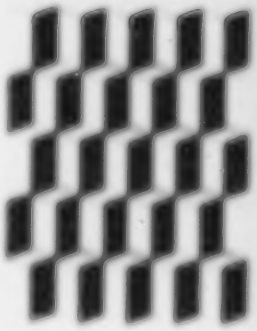

Student-Level School Resource Measures

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Introduction

Americans are obsessed with their public schools. They are especially focused on productivity -- what student outcomes do their tax dollars buy? How can better student performance be obtained with the same or lower spending? If more money is to be spent, where will it do the most good? In response to anticipations to the public, analysts are studying the question of which resources and types of organizations are more productive than others, but a major problem with these studies is the unavailability of appropriate resource data. Often the data are collected for another purpose resulting in an incorrect unit of analysis or the data lack sufficient detail. Data are most commonly available at the district level on a per pupil basis. However, these data are averaged over a great variety of students and programs and, as a result, they provide very imprecise measures of resources consumed by any particular student in a district. In addition, student-level data are often incomplete. There may be measures of average total expenditures or average experience of teachers, but seldom is there a relatively complete account of all the relevant resources received by an individual student.

The purpose of this paper is to discuss the types of student-level resource measures that would be performed if student-level resource data are collected on a regular basis in section one, the paper explores the types of questions that could be answered with student resource data. Section two surveys selective literature to show how analysts have approached answers to such questions with data now available. Section three discusses cost accounting concepts that are useful for thinking about how to collect appropriate student-level resource data. Section four recommends alternatives for NCES to consider. These alternatives take into account other related NCES data collection efforts, such as the National Education Longitudinal Study of 1988 (NELS:88), National Assessment of Educational Progress (NAEP), and Common Core of Data (CCD). Section five concludes the paper.

How Would Student Resource Measures Be Used: Questions Student Resource Data Could Answer

There are three types of frequently asked questions whose answers require student-level resource data. The three questions concern production functions, equity of resource distribution, and intent of resource distribution. All three are asked by policy makers, the public, and analysts. This section describes the nature of the questions, and the next section reviews selective literature where they have been addressed.

1. **Production function questions: with both the student and school as the unit of analysis:** What is the relationship between outputs and inputs, especially school inputs? Several more specific questions require production function knowledge:

   - **Resource effectiveness questions:** Examples: Do additional resources for children lead to additional outcomes? What kinds of resources and resource use lead to the largest outcome gains? These questions can be at a general level, or for a specific program (preschool, developmental or mixed grade classes), or for a specific type of student (at-risk or bilingual).

   - **Cost effectiveness questions:** What is the cost effectiveness of one program versus another. For example, reading mastery versus whole language?

2. **Equity questions:** Examples: Within a district, for students in different schools, or for different students in the same school, what are the resources directly attributable to them and are they equitable? What resources are they consuming? Both attribution and consumption questions are important. A resource may be attributed (what is assigned or allocated to a student) but the student may or may not actually consume resources all of that resource. The consumption question is often more difficult to answer than the attribution question. A key issue is whether student differences and resource differences can be matched to obtain valid and reliable vertical equity and equal opportunity measures.

3. **Resource intent questions:** For students who have been identified as entitled to specific resources (e.g. handicapped, bilingual, or compensatory education), do they receive additional resources? Does this match the intent of the financing system? This question can be addressed within schools and districts and across students, schools and districts.

These three types of questions all require some kinds of student-level resource data; that is, resource measures that capture the variation across different students. All of these questions have been addressed in previous studies, not always with the appropriate data. New data collection efforts should attempt to address the concerns raised by each of the questions.

Selective Literature Review of Studies that Use Student-Level Resource Allocation Measures

The purpose of this section is to identify the kinds of resource data that have been used in previous production, equity, and intent studies, and to evaluate whether these data have been adequate for the research. To this end, seven studies have been selected in each area and, therefore, this section is

Table 1. Education Variables in Educ Production Function Studies

Variable[a]	Study[b]
Characteristics of Teachers	
Teacher experience	A, B, C, D, E
Teacher education	A, B, C, D, E
Teacher salary	A, C, D
Total teacher quantity	A, F
Verbal achievement	B, D
Personality	B, D
Employment status	B, D
Turnover rate	B, D
Socioeconomic status	B, D
Job satisfaction	B, D
IQ's, or other test scores	B, D, F
Financial Resources and Facility Characteristics	
Expenditures per pupil	C, F
Administration	F
Instructional services	F
Curriculum services	F
Transportation	F
Miscellaneous	F
Quality of facilities	B, D
Policy and Environmental Arrangements	
Class size	A, B, C, D, E, F
Pupil-teacher ratio	C, B, D, F
Ability grouping	B, D
Classroom Space Characteristics	
Curriculum content	B, D
Instructional grouping	B, D
Learning materials	B, D
Time	B, D
Teacher expectations	B, D
Incentives	B, D
Reinforcement practices	B, D
Performance feedback	B, D
Programmed time student is engaged	B, C
Programmed time per person	B, C
Programmed time subjects/unit	B, C
Programmed time student's ancestry	B, C
Programmed time student's gender	B, C
Services per student	B, C
Process variables	B

[a] The classification of variables is taken from Hong and Raudenbush (1984).

[b] A = Hanushek (1986, p. 1146); B = Hong and Raudenbush (1984, p. 1); C = Hungerford, Link, & Li (1984, p. 1); D = Monk (1987, p. 1); E = Monk (1989).

education." Ronald Ferguson (1991, 465), who uses district-level data from Texas to estimate production function relationships. The research variables he uses are summarized in Table 1, and are indicated by F. Regarding data availability, Ferguson begins his article:

> Educating young Americans efficiently and equitably is a public concern, and secondary schools face fierce criticism. Among the primary reasons is the outpouring scarcity of data appropriate for evaluating the school's performance of various schooling inputs. As a result, recent research to discover how increasing spending might affect the quality of schooling and how improving the quality of schooling might affect how much children learn has investigated old data or has relied on data sets that are rich, limited in size and scope. (p. 463)

Ferguson makes a case for his district-level data in Texas, but also notes the need for disaggregated data in some cases. He concludes that while school expenditures are useful in part together a comprehensive and unique data set, they cannot always measure variables at the correct unit of analysis.

In an observational study, Bryce Hanson and Daniel Saks use detailed time allocations in students and schools data, and their relationship to learning in reading and mathematics (Hanson and Saks 1987). The authors explore technology and teacher values within the classroom. The variables they find are summarized under Hanson-Based Research in Table 1, and are indicated by B and D. The most additional key issues in this paper because it is one of the few that collects details at the student level and because it does used the report card grades as indicators of learning when more

[illegible]

as models for other data sets. They would be useful if collected by NCES for equity studies only if they were representative of schools in a specific unit such as a district or state, or inclusive of all schools in those units.

Intent Studies

The four studies we review in this section have used unique cost collection methods for answering questions about how resources flow to programs or schools. Only one study (Chambers et al. 1993) is designed to explicitly answer an intent question. The other studies are classified as intent because they could be retrained to answer such questions.

The resource cost methodology (RCM) utilized by Jay Chambers and Thomas Parrish and based on an ingredients approach developed by Henry Levin (1983) is employed to study the use of Chapter 1 funding (Chambers et al. 1993) and the cost of alternative programs for students with limited English proficiency (Parrish 1994). The method uses a bottom-up approach that begins with the program and client of interest and assigns costs to those programs. RCM is data intensive and generally expensive to employ. In the two studies reviewed here the authors have used what they call a "purposive" rather than a random sample of districts or schools, in part because of the need to collect extensive data rather than using existing administrative records. Clearly this collection effort increases the cost of a study.

The RCM does provide one way to get accurate cost data by program or client. As described by Parrish (1994):

> Essentially, the resource cost model system used in this study involves three steps: 1) disaggregating and listing the relevant set of service delivery systems or models required for any educational program, 2) determining the specific resources utilized in each delivery system, and 3) attaching prices to each of these resources to determine specific program costs. Overall and per pupil costs are determined on the basis of these programmatic standards and the number of pupils enrolled in each program. (p. 266)

If NCES were to develop a model way of collecting resource costs by students that included types of programs and types of funding for each student, researchers could approximate the RCM method for the students in the sample. However, the sample of students would need to be representative of the programs or funding sources for chosen randomly with respect to these) in order to make generalizations. The review of this method is useful primarily because it emphasizes the collection of detailed ingredients of resources by program and illustrates the need to go further for some purposes than an aggregate average per pupil expenditure number.

Bruce Cooper and colleagues have developed a School-Site Allocation Model (SSAM) that is a cost accounting framework for obtaining costs by function at the school level (Cooper et al. 1994). They have developed and tested the model in 10 school districts across the United States. The model is capable of generating costs by type of school (elementary, middle, high school) by five functions for the school site and for the central office. The five functions are administration, facilities and operations, staff support and development, pupil support, and instruction. The article does not give estimates of the cost of collecting these data, but does note that school districts are required to "use the same definitions of cost items and place them into the correct functional categories—meaning that clarity, consistency, and accuracy are essential." (p. 71). Thus, like

the Chamber and Parrish RCM, the data are most probably better than when obtained from normal administrative records, but the cost is high. And again, if NCES develops a prototype for student resource data collection, it may be easier for schools and districts to follow.

Yet another recent effort to find costs at the school level is the analysis by Coopers & Lybrand on behalf of the Mayor of New York City (Coopers & Lybrand 1994). Coopers & Lybrand label their model the School District Budget Model (SDBM). It crosswalks existing New York City Board of Education budget data into three classifications: functions, school type, and program category. The functions are: instruction-schools, instructional support-schools, operations-schools, operations-central and Districts, pass-throughs, and debt service. The school types are: pre-k, elementary, middle school, high school, and non-school. The program categories are: special education, bilingual ESL, other categorical, and regular education. In contrast with the RCM and SAAM, the SDBM collects no new data. Rather it finds ways to recategorize existing data. This is an important distinction, because it probably makes the SDBM less expensive per unit of data, but also less accurate. If the original data provide no clear indication of costs generated at the school versus the district or central level, then some assumptions need to be made to place the costs in these areas. The other two models must also make assumptions, but they are made earlier in the data collection process when categories of costs are created and schools or programs are instructed how to put each type of budget item into a category.

All three cost models reviewed here are efforts to obtain data by **school program** or **function** data that are more disaggregated than those available from normal administrative records. All three are expensive efforts, and there is some possibility that a comprehensive school resource definition by NCES could begin to lessen the expense by establishing a more well-accepted model.

We should also note that the three systems struggle with similar issues regarding allocation of overhead costs, central office allocations to schools or programs, and the appropriate level of disaggregation. In part their categories are driven by the purposes of the models. Cooper et al. are in part interested in determining what they call the "productivity" of various kinds of expenditures and, in particular, hypotheses that additional expenditures at the classroom level will be productive. As Coopers & Lybrand state, "Development of the SDBM evolved from the belief that the primary mission of schools is the direct instruction and support of students in the classroom. All other functions exist to support this basic mission." (p. 2). Chambers et al. and Parrish use their RCM to trace costs to programs or to find out how much supplemental spending there is on special programs. There is certainly no one right way to collect disaggregated data; methods depend on the purpose of the data collection.

Useful Cost Concepts

The cost accounting literature provides methods for measuring costs that are useful in decision making. In the context of this paper, cost accounting is valuable because it emphasizes the need to conceptualize the use of the cost data **before** the data are collected. This section reviews some of the key distinctions among types of costs for use in our assessment of alternative ways for NCES to construct student resource measures.

The distinctions described are:

- *Differences between departmental and product costing*

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- the ways that product full costs can be subdivided (direct and indirect, variable and fixed)
- the ways that components of product full costs can be allocated to students (process versus job-order costing and methods in between)
- real resource versus dollar costs
- the relevance of allocating components to students

Departmental costing finds the costs of administrative units, such as agencies, departments, responsibility centers, etc. A primary purpose of departmental costing is to help managers administer units efficiently. In other words, decisions using departmental cost data are centered on how to perform the department's activities with an efficient use of resources. **Product costing**, on the other hand, finds the costs of producing various kinds of products. Some primary purposes of product costing are to appropriately price a product, to determine reimbursement levels, and to help decide whether a product should be produced in-house, obtained by outside contract, or not produced at all.

In our study, the concepts of product costing are relevant because the questions to be answered with the resource data centered, for the most part, on the student products and not on the administration of the district or schools (units that "produce the education" for the students). We are interested in whether changing the way resources are allocated to students will change outcomes for the students, whether resource allocations to students are equitable, and whether students are receiving the resources that are intended for them. All these of these questions require ways to analyze resources linked to students rather than ways to assess the effective use of resources by particular organizational units. Naturally, the two questions of management effectiveness and student costs are related, but the distinction is useful when deciding how to design a resource measurement system.

Products are assigned Cost **full costs** if, after adding together the costs of all products in the organization, the organization's total costs are determined. Full costs can be subdivided in numerous ways, but two important distinctions are direct versus indirect and variable versus fixed. These are two different and not completely overlapping distinctions. That is, direct costs are not always variable and indirect are not always fixed.

Direct costs are those that can be assigned uniquely to one product. They are clearly incurred as a result of that product's production. **Indirect costs**, on the other hand, are incurred as a result of production of many products; they cannot be assigned, except by a rule, to just one product. They are often called overhead costs. When students are the product, instructional supplies such as textbooks, pencils, and writing pads are clearly direct costs while the time of administrators such as the superintendent's time is clearly an indirect cost.

Variable costs change as more units of the product are produced. For students, these are costs that increase when more students are added to a school. The amount of food for lunch is an example of a variable cost. Variable costs may occur in steps rather than **fixed**. For example, when class size reaches the point that an extra aide or teacher is needed. In such cases, groups of additional students result in changes in costs. **Fixed costs** stay constant as more units of a product are produced. For students, the school's physical plant is a fixed cost until capacity is reached. The cost of the principal is a fixed cost. The distinction between fixed and variable costs depends on the time frame and on the circumstances. Physical plant becomes

a variable cost at the point where capacity is met or when the plant needs replacement. The cost of the principal becomes variable when more students require the hiring of assistants to help manage the school. Some costs have both variable and fixed components called semi-variable costs. For example, transportation costs for students involve a fixed component (the buses and drivers) and a variable component (the gasoline required to travel to pick up additional students). Again, the fixed costs become variable when the bus is full or needs replacing.

There are two systems for assigning direct costs to products. In reality some combination of the two systems is generally used, but when conceptualizing a costing system, the distinction between the two systems is useful. **Job-order costing** determines the costs of each individual unit of a product. A common example is the determination of the cost of hand-made, custom-ordered furniture, where the specific material and amount and kind of labor would be determined for each piece of furniture. **Process costing** determines the costs of groups of identical units and then divides by the number of units to obtain an average cost. A common example of process costing is the determination of the cost of a box of a certain kind of breakfast cereal. The time needed to track costs to each box would be great and since there is unlikely to be much difference between boxes, it is unnecessary for decision making. Job-order costing provides more accurate information, however, it is more difficult and expensive to collect. Many school cost accounting systems are hybrids of job-order and process costing.

Assigning resource costs to types of students could be done either way, although some process costing would probably be necessary even when job-order system is developed. For example, we could take individual students classified by type of school, type of special funding if any, type of academic program, etc. and then use a sample to determine as exactly as possible how much teacher time, other personnel time, and instructional supplies are used for the student on a period of time. However, there might be some direct costs, for example physical education teacher time, for which an assessment of time spent with each individual student would be unnecessary. These costs might be accepted as wholly process (classes or schools of children) and then divided by the number of children. Processing costing as also demonstrated at the other end of the continuum, process costing could be used at various levels of aggregation. For example, costs could be assigned by classroom (or grade, school district, academic program, or type of funding) and then divided by the number of students.

Real resource costs are stated in terms of a resource's natural units. Teacher resources would be determined as positions or time per student, computers as numbers of computers or percent of time per student. The advantage of real resource costs is that comparisons across time or parts of the country can be made without worrying about the different purchasing power of dollars. For example, if beginning teachers of equivalent quality are paid differently in southern versus northeastern states, costs stated as positions or time will more accurately reflect what students receive. On the other hand, **dollar costs** have advantages. Dollars are a common measure that allow us to aggregate different kinds of resources into one number to address, they can be adjusted for differences in purchasing power and if they are they can reflect differences in quality in ways that counting positions or minutes cannot. For example, a more expensive teacher might also be a more effective one and dollars can help indicate this.

Recommendations for NCES Student-Level Resource Measures

This section builds on the analysis of the cost of resource measures, the selective literature review, and the basic components of cost accounting systems to formulate recommendations for NCES as it considers whether to invest in the collection of student-level resource data. In addition to the issues of the policy literature as discussed in, we also have reviewed various NCES activities that relate to the development of a student-level resource measure. First, Chapter 1, "Cost Accounting for Educational Programs," of Financial Accounting for Local and State School Systems (1980) presents an approach cost of cost accounting to LEAs, and discusses uses, designs, and applications. Second, NCES has a successful history of student-level data collections, most notably the National Longitudinal Study of the High School Class of 1972 (NLS-72), High School and Beyond (HS&B), and the National Education Longitudinal Study of 1988 (NELS:88). Both activities have implications for our recommendations.

Our recommendations should be viewed as a cost-benefit framework. While we feel that NCES has invested sufficiently in a full assessment of alternative courses of action is clearly beyond the scope of this project. The cost-benefit findings together our recommendations, with some consideration of costs, although it is a point we note that the NCES perspective.

The initial question that frames the recommendations on the development of a student-level resource measure is the purpose to which it will be used. This is particularly important here because the design of cost systems can vary according to their purpose. We identified three broad purposes or policy issues where student-level resource measures could be utilized: a student-level resource measure could help answer questions facing our education system, support state or local budget, or analysis of data and personal transfer from a student-level resource measure. Research for questions of effective resource use should be placed at a slightly higher priority than the other two purposes. It may be that an effort to develop a student-level resource measure can serve all these purposes simultaneously, but we suspect that choices will need to be made and need to take into account the higher priority purpose.

If the student-level resource measure will be used to assess the effectiveness of resource use, then the measurement system will need to link resources with student outcomes. That is, not only is it necessary to measure resources, usually in terms of dollar costs, it is necessary to know the different outcomes that are achieved by students so that the resources and costs can be linked. Note that NCES already has experience with complex data sets with the student as the unit of analysis, where outcome measures are included (e.g., NELS:88).

Based on this higher priority purpose for effective uses of resources use, NCES should move ahead to develop a framework for a student-level resource measure, regardless of whether the data are actually collected. This development should take place before a decision is made to actually collect the data to permit substantial input into its definition and design. Given the likely concern of data that will need to be collected and the projected cost of each an effort, there needed by broad input into the development of this framework. Note that one of the school data collection efforts by NCES does not exist, the development of a framework could benefit other efforts at the state or local levels to collect data on student

A student-level resource measure will need to build upon the existing financial accounting system. The financial accounting

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system produces the basic elements that will be categorized and combined into a cost accounting system. Then, the student-level resource measure will need to take into account the basis of accounting (cash/modified accrual) which means that there are not precise distinctions between operating and capital items, and the fund structure which sometimes creates accounting-based divisions of expenditures that are not appropriate for a student-level resource measure.

The framework for a student-level resource measure will need to consider the following elements. First, will the measure be based on organizational units (department of zoology) or student (product costing)? Given the primary purposes for pursuing this cost information, a **student-based system (product costing)** will be required. While an organizational model can provide information on certain divisions of resources, such as instruction versus non-instruction, without more specific links to outcomes at the student level, questions of resource effectiveness cannot be addressed at an appropriate level of disaggregation.

Second, will the student-based, student-level resource measure distinguish among the following concepts?

- **Full versus partial costing.** To determine resource use, it is desirable to obtain measures of full costs, not a partial measure that may exclude some "overhead" or other costs. The need for full costs is important because when these costs are broken down, the list will give analysts an indication of resource distinctions among students. If full costs are not gathered, then there is a risk that different types of enrolled students will be assigned to different schools or that the specific list an analyst would find valuable is missing. A full cost definition will need to be applied consistently to all settings. In several areas, like example, teacher pensions, which may be partially or wholly state-financed, the state and local accounting systems must make exclusive use of full costs difficult.

- **Direct versus indirect activities.** We believe that this is an essential distinction to assess resource effectiveness, and to translate the results of the analysis into practical recommendations. Indirect costs must often be allocated by formula to students and thus will not always be useful to analysts. Also, with this distinction and the further delineation of types of direct and indirect costs, the effectiveness of different resources and in different combinations can be assessed. Any cost accounting system will be better evaluated and validity able to specify direct costs compared to indirect costs. If the distinction is used, the data should also contribute to the debate over whether resources spent in the classroom, on an instructor, or for specific types of instruction (such as professional development) are more productive than other patterns of resource use. Note that the conceptual distinction may be useful but may be affected by the nature of the accounting system. For example, things benefits, health coverage, pensions, etc.) would be usually defined as direct, but they may be accounted for in a manner that prevents, at the state or district levels such that they are precluded in a direct costing method.

- **Different educational programs.** This would include, for example, regular instruction at elementary, middle and high schools, special education at different levels, vocational education, etc., as well as

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support programs such as school administration, district administration, facilities maintenance, transportation, etc. This distinction is important since both educational client targeting is organizational and organizational client tasks are structured for management process of costs. All activities should be categorized in one of these three groups.

- **Propose various job order costing.** Recall that process costing is used when the resources are does not vary across the units using the resources and the units themselves do not vary. For most educational issues, both the resources are rather differentiated (school time for different projects) and the units (students) are different from one another. Thus, to the degree possible, a student level resource measure should employ a job order costing system to reflect the variation in resources and across different projects.

- **Alternative funding sources** (e.g., local, state, and federal). From a policy perspective, this is an important variable because the revenue distribution system can be tied to the level of government that finds it cost accounting goals of cost. One step for one of the more difficult aspects of the process to capture. In the teaching and learning level, for instance, think all students are served, and in fact in certain districts are viewed by the government to determine the funding source in the same way, as they use the other distinctions are receiving programs, district versus national, etc.). To some degree it is best done to create effectiveness. It is a conceptual issue present to track the source of funding, and given the strong influence of the environment

normal system, it would be desirable to include this dimension.

- **Methods for allocating indirect costs.** Indirect costs, by their nature require cost allocations to obtain full costs. Key decisions in the indirect costing system become which costs are indirect include the basis for the allocation (students, square feet, teachers, etc.), and the method for the allocation (one step, two step, etc.). The basis and method of allocation should be made very clear for many purposes and its may want to cover the indirect costs of the formula's mechanism.

- **Capital versus operating resources.** One of the shortcomings of G.A.A. accounting systems, and all governmental accounting systems in general, is the expensive treatment of capital costs. Ideally, some annual contribution of capital (for example the school building or the school buses) should be included in a student level of resource measure calculations. Because accounting concepts such as depreciation are not used extensively throughout school district accounting systems, capital items will probably require special treatment. While it is possible to think of using proxies for depreciation, such as annual rate with a principal and interest payments, one would need to proceed very carefully. It is quite possible capital is financed quite differently across districts in terms of the percentage that is debt financed versus the percentage that is purchased with current funds.

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Proposed "Good Practices" for Creating Data Bases from the F-33 and CCD for School Finance Analyses

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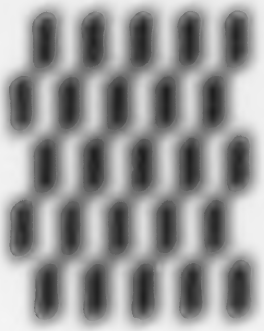

Proposed "Good Practices" for Creating Data Bases from the F-33 and CCD for School Finance Analyses

Proposed "Good Practices" for Creating Data Bases from the F-33 and CCD for School Finance Analyses

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Introduction

Background

records from their primary data sources: the F-33 and CCD surveys (revenue, expenditures, and enrollment data) and the Decennial Census (demographic and economic data). Revenue, expenditure, and enrollment data from the F-33 and CCD surveys are the sine qua non for national school studies and demographic and economic data.

Objectives

This paper provides future users of these data sets (and subsequent releases thereof) with an introduction to the major issues regarding creation of a data base for analysis. Based on the procedures followed by the ASR, CPRE, and Policy Associates researchers, this paper summarizes a methodology for selecting the records (i.e., school districts) appropriate for most school finance analyses.[1] This methodology is offered as a potential model for future data base creation and modification.

By presenting the issues and caveats regarding initial modification of the data, and by presenting a methodology for data base creation, the authors hope this paper will encourage greater standardization among users. Individual research methods will (and should) always vary, but with explicit data base creation procedures, researchers' conclusions can be debated on their merits rather than dismissed due to variations in the underlying data sets.

Organization

Subsequent sections of this paper include descriptions of the F-33 and CCD data sets, the use of these data sets in past studies, issues identified during creation of the data bases for the ASR, CPRE, and Policy Associates studies, and a proposed process for modifying the data sets. The proposed process includes the steps taken to address the issues identified by ASR, CPRE, and Policy Associates researchers and notes the additional issues (e.g., adjustment for special-needs pupils) that could not be addressed fully or were not common to all three studies.

Major National Data Sets Used For School Finance Research

The Census Bureau's Survey of Local Government Finances for School Systems (F-33) and the National Center for Education Statistics' (NCES's) Common Core of Data (CCD) are the two national data sets most relevant to school finance research.

The F-33 is conducted annually by the Census Bureau under contract with NCES. Although conducted annually, it is not based on a universe of school districts each year. Typically, the survey includes all districts in all states in years ending in 2 or 7 (1982, 1987, and 1992). To obtain financial data which corresponded more closely to the decennial censuses, NCES also sponsored special F-33 surveys in 1990 and 1991.

Consequently, F-33 data are available for all districts for the 1979–80, 1981–82, 1986–87, 1989–90, and 1991–92 school years. For the intervening years, the F-33 includes data on all districts for 33 to 35 states, but only a sample of districts in the remaining 15 to 17 states.

The CCD contains data at three different levels from five different surveys. It includes universe files for state agency information, and school list data. These files are based on data from the F-33 and the School and Staffing, Public Elementary-Secondary Agency, Public Elementary-Secondary School, State Non-Fiscal Elementary and Secondary Education, and National Public Education Financial Surveys.

The District Mapped Census data are available as a result of the NCES-sponsored "School District Mapping Project." For the project, the Census Bureau used household-level data for census tract from its 1980 and 1990 decennial censuses. The Bureau took geographic coordinates for each state's census tracts and school districts and aggregated (or mapped) the tract-level data up to the district level. As a result, the District Mapped Census data include a wide variety of demographic and socioeconomic information for each of the nation's school districts.

Recent Uses Of Major School Finance Data Sets

The F-33 and CCD data sets have been used extensively for studies conducted by researchers at MR, CPRE, and Policom Associates during the last two years. The MR and Policom Associates researchers also used some of the district-mapped data. The studies' foci, or emphases, are presented in Table 1 and the data elements used by the Policom Associates study are presented in Tables 1a and 1b.

Other major national school finance studies utilizing the F-33 data include those by Wyckoff (1992), Ruddle (1990), and Schwartz and Moskowitz (1988). Wyckoff used enrollment and current and instructional expenditure data from the F-33 to examine changes in resource equity between 1980 and 1987. Ruddle also examined resource equity using F-33 data, but for 1987 only. Schwartz and Moskowitz used F-33 enrollment, expenditure, and revenue data, as well as 1980 district-mapped income, poverty, and property data to examine changes in horizontal equity and equal opportunity between 1977 and 1985.

Unlike the MR, CPRE, and Policom Associates studies, these three earlier studies did not use a consistent approach to data processing and provided only summary information about the approach that they did take. For example, Schwartz and Moskowitz discussed the problems associated with using sample data and listed the number of districts excluded in their analyses (by states), but they did not indicate what criteria they used to include those districts and exclude others.

Ruddle included a lengthy discussion of the limitations of school finance data, but provided very little information about which or how many districts he included in his database. Other than noting that he screened out districts with low enrollments," he provided no information about the creation of his database and no information about whether he screened for special or non-operating districts.

Wyckoff provided more detail about his data base than Ruddle, Schwartz, or Moskowitz. Like Ruddle, Wyckoff noted some of the basic limitations of the data (e.g., data by state's variations in classifying expenditures) but Wyckoff also noted the total number of districts in the 1980 and 1987 data sets, the number eliminated because they were not unified, and the number eliminated because they were community college, vocational, non-operating, or service districts. However, Wyckoff did not provide the number of districts included by state or any other details about his data base and the variables contained therein.

Given the lack of information and apparent inconsistencies regarding data processing, researchers working on the MR, CPRE, and Policom Associates studies collaborated and, to the extent possible, standardized their data base creation process. The issues identified during the course of this collaboration are discussed in the following section.

Table 1 -- Foci of three recent school finance studies

Study	Focus
ASR	Variations in school district revenues and [illegible] between districts of differing characteristics (e.g., size, urbanicity, geographic region, and student composition) in 1990
CPRE	(1) Magnitude and patterns of equity in public school revenues by state and region in 1990; and (2) Cost of equalizing revenues within states in comparison to the cost of equalizing revenues by region or across all states
Picus et Associates	(1) Trends in revenue-based school finance indicators within states between 1980 and 1992; and (2) State profiles of school finance indicators, legislation, and litigation

[illegible] Picus et Associates

Table 2a -- Census variables used by Picus et Associates

Name of cell	Description	1980 Table	1980 Item No.	1990 Table	1990 Measure Type	1990 Item No.
[illegible]	Median Household Income	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Residential Property Value	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	Percentage of Children at Poverty	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]
[illegible] Picus et Associates

Table 16 — F-71 Variables used by Federal Aggregates

Sources F-33 Descriptions	1966 Variable F code	1967 Variable F code[a]	1969 Variable F code[a]	1982 Variable F code[a]
Local Property Taxes	F41	F36	F36	F36
Local Gen. Sales Gross Receipts Taxes	F09	F09	F09	F09
Local Public Utility Taxes	F15	F15	F15	F15
Local Personal Income	F49	F40	F40	F40
Local Corporate Net Income Taxes		F41	F41	
Local Parim Gaint Custody	F42	F42	F42	F42
Local Revenue - Cmrs & Coalition	F03	F03	F03	F03
Local Gross Receipts From Sobeet Latch	F09	F09	F09	F09
Local Other Sales & Service Revenue	F12	F12	F12	F15, F17, & F20
Local Misc. Offer/ Local Revenues	F99	F99	F99	F97 & F28
Local All Other Taxes	F99	F99	F99	F99
Local Education, Other Charges		F23	F23	F23 & F25
Local Intergfuhovt Transfer	F01	F01	F01	F01
State Direct Aid	F21	F21	F21	F301, F306, F115, F139
State Revenues on Behalf of Schools		F27	F27	F39 & F70
Federal Aids E.SE.A	F32	F28	F28	—
Federal Aids VOE A	F33	F29	F29	—
Federal Child Nutrition	F35	F35	F35	F35
Federal All Other	F39	F39	F39	F344 F35, F36, F61, F62
Federal Direct P.L. 815	F03	F03	F03	F09
Federal Direct P.L. 874	F04	—	—	—
Federal Direct All Other	F04	—	—	F03
Enrollment	F07	F10	F10	F10
Current Expenditures	F11-F17	F12	F12	F12, F70, F75, F80

[a] Exact 1967, 1969, and 1982 variables, except Enrollment (F10), not scaled up to a factor of 1,000

e - Input completely - exact

— Not available

F33 BCS - Federal Aggregates

Data Base Creation Issues And Process

While the F-33 and C-130 data sets are tremendously valuable resources, they have their limitations, and there are a number of data base creation issues which need to addressed clearly for any users of the data. These issues deal primarily with efforts about or record selection -- i.e., the process by which "appropriate" divisions are selected for analysis and inappropriate divisions are eliminated.

These key issues emerged as the research team planned their studies and created their data bases:

1. F-33 Sampling,

2. Divisional Types, and

3. Divisional Subsets.

Each of these issues and the considered process used to address them is discussed below.

F-33 Sampling

For seven years, the F-33 survey is based on a sample of divisions (a 1-in-4 or 1-in-5 basis). Existing files and reporting of missing units are accordingly, are one of their main foci for study using the data. One researcher also made considerable effort in maximizing the efficiency of retrieval data for these divisions without sustaining that for the entire F-33 data base (Dunbar, 1984).

As the years, researchers have dealt with this complexity in a variety of ways. For example, Schwartz and Moskowitz weighted data for 27 states for their 1984 AP paper, analysis. They note, "It is difficult to assess the impact of these sampling procedures on estimates of local sports [because] products of distributions of sports statistics are often unknown or are difficult to obtain and ... the sampling procedures are quite complex and variance estimates are not straightforward."

In part to simplify the division sampling data, the SDR study used data for 1984 only -- also an F-33 intensive year. Given the F-33 sampling issues, the Fisher, Associates and (1984) studies also used F-33 data for just one year only. Researchers interested in the intervening years either have to (1) base their study to the 19 states for which data from a universe of divisions are available, or (2) estimate the uncertain bit of error resulting from weighted data for 27 or 27 states, or (3) attempt to estimate the sampling error for the weighted data.

Division Types

The F-33 and C-130 contain various types of divisions which are "special" because of their instructional programs or missions. These special divisions include community college, agricultural, vocational-technical, correctional, special education (e.g., BOCES divisions in New York State), and "non-traditional" divisions. Non-traditional divisions have students that no buildings and include hospital, nature centers, private, media centers, and other support units or service divisions.

The SDR, (1984), and Fisher Associates studies made to considerable lengths to include such division because (1) these programs have considerably different enrollment needs, (2) they often desire to have leads through categorical aid formulas that are different from those used for "regular" operating" divisions, and (3) their leaders often challenge or discriminate those of regular operating divisions.

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The Empirical Argument for Educational Adequacy, the Critical Gaps in the Knowledge Base, and a Suggested Research Agenda

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The Empirical Argument for Educational Adequacy, the Critical Gaps in the Knowledge Base, and a Suggested Research Agenda

The Empirical Argument for Educational Adequacy, the Critical Gaps in the Knowledge Base, and a Suggested Research Agenda

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Introduction

This paper develops the idea that the goal of educational adequacy, that is, high minimum educational outcomes for the disadvantaged is constrained by lack of a strong knowledge base and that a well-formulated research agenda can make an important contribution to policy.

Currently, school finance is subject to conflicting and confusing pressures. On one hand, improved educational outcomes have probably never been so highly valued. The link between successful schooling and economic prosperity for both the individual and society is widely accepted (Gamoran 1996, National Education Association 1995). On the other hand, the link between educational outcomes and educational reform and investments is widely doubted (Hanushek 1994), and resources for education and all other public spending are becoming more limited (Gold 1995). Education for the disadvantaged raises these concerns in a particularly acute way. Poor children make up the bulk of students whose educational outcomes are seriously below economically functional minimums (Berne 1994b, Levin 1991), and remedial education is the target of especially strong skepticism and political resistance (Guerra 1993, Herrnstein and Murray 1994).

Under these circumstances, in which an emphasis on outcomes and skepticism about costs exists, it is natural that strains are developing in the traditional goal of equity in school finance (Clune 1994b). Equity guarantees inputs regardless of outcomes at a time when social pressures are moving in the opposite direction, toward outcomes which are guaranteed and costs which are contingent. This paper responds positively to the social environment by trying to develop a research agenda which has the capacity to clarify the relationship between educational investments, educational practice, and educational outcomes for the disadvantaged. The fundamental goal is cost-effectiveness, or productivity (Clune 1995c). As a later section will argue, once society (including the courts) becomes satisfied with a vision of how high minimum educational outcomes can be produced at minimum cost within an affordable budget, any necessary affordable

amounts of additional funding will probably be forthcoming. More importantly, the proper direction for educational reform will be clarified as we learn about productive modifications of existing systems of educational governance and finance.

To show the importance of research, the paper must demonstrate both the promise and incompleteness of the existing knowledge base. The organization of the paper will outline the empirical "argument" for adequacy, including the building blocks of a policy-relevant agenda, showing within each element the importance of the topic, the problem for research, and the suggested agenda for further research. Accordingly, each section which follows addresses a distinct area of research important to a better understanding of the issue of educational adequacy.

The definition and level of minimum educational outcomes

As if the problems of actually achieving it were not difficult enough, adequacy also confronts a number of serious, threshold problems of definition and political acceptability (Chambers and Parrish 1983). "Adequate" means sufficient for some outcome. However, the definition of the target outcomes and the availability of possible means to the outcomes are both socially controversial and subject to competing demands for other private and social goods. What package of social outcomes, such as economic productivity and good citizenship, is to be produced by the schools? And, at what levels are these outcomes to be achieved—through what kind, duration, and intensity of schooling, and at what permissible cost? Further compounding the complexity is the question of what value to place on equality. Societies have aggregate "taste" for equality (or distaste for inequality, or at least human misery), but questions of equality are even more obviously controversial and contingent upon available wealth.

Problems of defining adequacy might seem to justify research on the social costs and benefits of education for the disadvantaged. Henry Levin, for example, developed a case for compensatory spending based on both the benefits of good education and the social costs of poor education (1981). This and other arguments about returns to education are certainly relevant, but the social controversy surrounding the issue makes them necessarily inconclusive (e.g., how certain are we that compensatory spending in the present will reduce crime costs in the future, and how willing are today's taxpayers to make such an investment?).

Fortunately, defining adequacy is one of those rare problems which is practically manageable in spite of being conceptually difficult. The key is distinguishing between three different issues: the basic definition of competence, the resources, and the details of measurement. While the level of required competence is conceptually and politically difficult, society does regularly resolve it. Many political and social processes operate to define minimum functional skills in society, including the official acts of legislative bodies in setting standards and the demands of the business community for skilled workers. Standard setting for education is, in fact, both fundamental and historically well established. The gradual spread of mass education through successively higher levels of schooling, culminating in universal high school education, is one historical example (Chambers and Parrish 1983). Providing high school education for all those who would otherwise not obtain it is considerably more expensive than the incremental cost of raising minimum scores, whatever that cost might be. Indeed, public education itself is based on a notion of adequacy. The combination of courts recognizing adequacy as one of the purposes

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of public education, and state legislatures defining minimum functional levels of achievement, is probably the main example of how social processes do, in fact, resolve the indeterminate conceptual difficulties. It is noteworthy that mainstream institutions have a strong incentive for accuracy in defining adequacy and no obvious political bias. Commercial enterprises, for example, need workers with a minimum of general skills, but do not want to pay for more skills than are necessary.

The second question about adequacy is that of available resources. Here, one might think there is an obvious political problem, perhaps even an impasse, over redistribution of wealth. Wealthier taxpayers resist transfer payments to the poor (Goertz 1983), and protection of minority interests blocked in the legislative process is one of the classic functions of courts (Clune 1984). Yet school finance reform has a much broader base than that of some minority interests. Public finance suggests that it is rational for society to pay for the external benefits of education, and the political process seems to behave in approximately that fashion. Educational spending has grown faster than the cost of living for many decades (Odden and Clune 1995a) and maintains its relative position even in the midst of calls for austerity. All educational spending involves a transfer from taxpayers to those being educated. There are very few who call for the outright repeal of educational subsidies or even the rollback of universal high school education. Compensatory aid for the poor is enacted by legislatures, even in the absence of court mandates. Litigation over school finance frequently involves courts siding with a substantial minority of aggrieved districts (Alexander 1991; Grossman 1995, forthcoming). It seems likely then, that a substantial amount of extra money could be found for adequacy, even ignoring the fact that adequacy produces substantial savings such as reductions in retentions in grade and special education (Barnett 1995), and could be financed by relatively small adjustments in existing funding. Thus, money probably can be found to support adequacy, if the educational system can be persuasive in removing doubts about the weak link between increased spending and better outcomes (the very topic of this paper).

The third set of issues about defining adequacy concerns how to measure it. Courts frequently develop long lists of desirable outcomes for education (*Rose v. Council for Better Education, Inc.*, 790 s.w. Ken. 2d 186, 212-13 [1989]; Underwood 1995, forthcoming). A lively debate presently exists about the importance of "basic skills" versus "higher order thinking" for disadvantaged children (Commission on Chapter 1 1992). Recently developed state-of-the-art tests in Kentucky and California have resulted in many students failing to achieve a "proficient" score (Kirst et al. 1995). The impression left by such debates is that the precise operational definition of adequacy is hopelessly confused. Inevitably there are many complex issues to be resolved in actually developing a test of student achievement (Trimble and Forsaith 1995, forthcoming).

I am skeptical about the extent of the real disagreement, however. As with defining adequacy and resources, there is probably more theoretical than practical confusion. A simple working definition of adequacy includes basic proficiency in literacy, numeracy, and problem solving; completion of a standard high school education; and perhaps eligibility for higher education. The question, then, is how much any specific measurement of adequacy really departs from this conceptual core. A reasonable hypothesis is that various tests are highly correlated, various standards define approximately the same level of performance, and all standards assume continued attendance and progress through the years of schooling. For example, "high minimum achievement" probably is very close to a different standard sometimes

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The empirical question is whether, for practical purposes, the problem of educational adequacy is a problem of high-poverty schools.

recommended: average achievement among disadvantaged children equal to the average of the population as a whole. The higher levels of proficiency demanded by avant-garde tests probably should be regarded as an effort to change educational content and raise standards for the future.

Research which examines the degree of conformity among various standards of adequacy in the United States might help establish the existence of social consensus over adequacy and dispel confusion over specific standards. Clearly, policymakers could benefit from a better perspective on the differences and similarities among various operational definitions. It would be useful to know the fiscal status of poor children in terms of availability of resources. How much compensatory aid is already available from what sources? How do such children stand relative to others in the state and in the country when this aid is added to the base funding of the schools attended by poor children? Such data could begin to provide a view of the spending gap for adequate compensatory funding. Fiscal data could then be added to the data base on high poverty schools as suggested below.

The extent and distribution of inadequate educational outcomes and the overlapping populations of special needs children

Part of the case for previous reform movements aimed at meeting special student needs was an empirical demonstration of the extent and distribution of the exclusion from educational opportunity (Clune and Van Pelt 1985). Available data on high-poverty schools suggest a remarkable picture of low outcomes, inadequate inputs, and overlap with minority status (Berne 1994a; Natriello 1994). The empirical question is whether, for practical purposes, the problem of educational adequacy is a problem of high-poverty schools. Existing data suggest that perhaps 90 percent of the aggregate subminimal outcomes in the United States are located in perhaps 10 percent of the schools. This is the familiar issue of concentration vs. diffusion under Chapter 1—the great majority of elementary schools get some Chapter 1 money (American Institutes for Research 1993). Further, even including compensatory aid, such schools are often funded at or below the average for the state, and have many obvious deficiencies in standard inputs, especially lack of a qualified and stable teaching staff (Berne 1994b; Kozol 1991). But, as with the earlier reform movements, existing data have been developed for litigation or other special purposes and are available only for certain states and cities. Development of a national database comparing high-poverty schools to other schools on multiple dimensions would be an important contribution.

A second important issue is the extent of overlap of various categories of special needs children within the disadvantaged category. On one hand, linguistic limitations and handicapping conditions do not represent the same need as poverty, and the conditions may be cumulative. On the other hand, there is some overlap. Nominally different programs may be triggered by the same set of educational indicators (e.g., low test scores); and the same remedy may be appropriate for different conditions (see Madden, Slavin, Karweit, Dolan and Wasik [1991] on using special education teachers for acceleration of reading for all students). The issue of overlap has both financial and pedagogical consequences—the amount of aid required and the kind of appropriate educational interventions.

The sheer feasibility of substantially raising minimum performance

Much confusion still exists about whether it is possible to reliably raise the achievement of disadvantaged children up to

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high minimum performance, within any reasonable range of resources. *The Bell Curve* (Herrnstein and Murray 1994) takes the position that remedial education produces small, uncertain gains with ordinary resources and that only adoption of infants by high SES families produces a big effect. Ralph and colleagues maintain that the distribution of achievement is remarkably stable and little influenced by quality of schooling. For example, children in the bottom ranges of achievement do not catch up to the 4th grade performance of their higher achieving classmates until practically the end of schooling (Ralph, Keller, and Crouse 1994). On the other hand, Slavin and his colleagues (1994) claim to be able to raise the reading achievement of elementary students to grade level (average) "whenever and wherever we choose." There is also some evidence that the lower achievement of disadvantaged 12th graders actually represents nothing more than the accumulation of small annual increments of a magnitude which could be remedied by year long schooling (Gamoran in press). Additionally, some research on production functions and cost analysis finds substantial effects from feasible increases in resources (Clune 1995b; Duncombe, Ruggeriero, and Yinger 1995; Ferguson and Ladd 1995).

One persistent source of confusion in such research is the difference between reporting results in terms of norm or criterion references. Even a small yearly gain in standard deviations or percentiles may represent a significant portion of the goal of high minimum performance. Failure to focus on lower achieving students is another problem. Traditional quantitative research which examines the data on disadvantaged children in terms of criterion-referenced minimum achievement standards might help clarify the picture.

Another obviously important source of research is evaluation of accelerated schools (in the generic sense which includes all schools with an accelerative mission). The theoretical ideal would be to have accelerated schools cooperate in some kind of quasi-experimental design, although much could be learned from readily available data which is simply not reported. Accelerated schools are designed to operate on a tight budget and often lack the resources needed for a thorough evaluation. Slavin's "success for all" schools (Madden et al 1991) are an exception in providing longitudinal data on student achievement. Even these schools, however, fail to provide the most minimal data on costs (Barnett 1995). While feasibility might be addressed simply by longitudinal achievement data, cost is also of great importance because of the political relevance of cost-effectiveness. Educational and implementation processes are additional facets of accelerated school networks which should be investigated under the general heading of feasibility, addressed below. Thus, funding and management of an evaluation data base for a group of accelerated schools would seem to be well worth the investment. After all, the schools themselves are already expending much higher levels of resources necessary to programs which produces the effects.

Geographic mobility, irregular attendance and the problem of partial and shared responsibility among schools

Geographic mobility of students attending urban schools is a problem for adequacy in several ways. It is a serious challenge to the model of school accountability and school improvement because schools cannot be held responsible for the full annual achievement of students who spend a shorter time in the school (Ferguson and Ladd 1995). Behind accountability lie problems of enrollment management and organization of service delivery. Student mobility can be reduced to an unknown extent by administration (e.g., altering enrollment zones and providing transportation) and by encouraging stability through the quality of education at particular

Slavin and his colleagues (1994) claim to be able to raise the reading achievement of elementary students to grade level (average) "whenever and wherever we choose."

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...we have known the basic elements of successful accelerated education for some time: an accelerated curriculum... high expectations for student learning, a positive school climate... and a safe and orderly environment (Purkey and Smith 1983).

schools. In the latter case, mobility is considered an "endogenous" problem of school quality (Barnett 1995). To the extent that changes in attendance cannot or should not be avoided, the question is how to organize the delivery of educational services (e.g., how to coordinate programs under conditions of shared responsibility). Mobility seems to affect student achievement, that of both the transferring students and the other students (Ferguson and Ladd 1995). The delivery system, however, is fundamentally blind to mobility and organizing instruction based on an assumption of continuous instruction in one place. Mobility also may have strongly differential effects on different kinds of high poverty schools, creating a system of unequal, stratified responsibility in urban school systems. Magnet schools, for example, not only attract the most qualified students, but are able to control attendance in advance through the process of selection. Neighborhood schools, on the other hand, are stripped of the most able students and must bear the brunt of all of the problems of student mobility, including late registration and high annual turnover (Moore 1990). Irregular attendance is both an additional and compounding factor for schools' responsibility.

Because mobility may be an important, unmeasured aspect of educational need, it is important that we obtain more and better data on the extent and kind of mobility and attendance in the variety of high poverty schools. Where possible, the effect of mobility on achievement should also be analyzed.

The educational technologies of accelerated education

Accelerated education is the ultimate goal of educational adequacy (Levin 1988). If poor children could learn the same material as other children at the same pace, they would not be educationally disadvantaged. A longitudinal study of students in Chicago found that only four percent graduated with a reading level above the national average. Two key educational outcomes where the students lagged behind were devastatingly significant in relation to acceleration: graduation from high school, and reading as a vital measure of student achievement (Moore 1990).

In one sense, we have known the basic elements of successful accelerated education for some time: an accelerated curriculum (or, more accurately, not a retarded curriculum), high expectations for student learning, a positive school climate (for both students and staff), and a safe and orderly environment (Purkey and Smith 1983). In another sense, however, these are intermediate outcomes, or indicators, of a successful educational process, which are not self-explanatory about how such desirable characteristics are produced. It is obvious that an accelerated curriculum is a key part of accelerated education, but it is extremely unlikely that accelerated education can be produced just by changing the content of courses and textbooks. Appropriately tailored subject matter, skills of the teachers, and the minds of the students must converge around a complete learning process which is rare in high poverty schools.

The central question, then, is what the staff of the school must do that is different. Research has also established various answers to this question: staff development to raise expectations and acquire new teaching skills, extra staff time spent assisting students with learning problems, and outreach to the families and caretakers. (See Barnett [1995] for an overview of three approaches to accelerated education.) The key gap in our knowledge concerns how these elements can be combined, the conditions under which various combinations are successful, and, ultimately, the feasibility and cost of various approaches. For example, if the staff development through outside consultants, alone, is enough for the typical

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high poverty school, the cost would be relatively minor (Barnett 1995). But if that model is successful in a small percentage of schools, additional, more expensive changes may be also required in the typical school. These changes might include preschool, extra staff for tutoring, higher salaries for more skilled teachers, and a higher budget for school safety and security. Even the best designed program, supported at the highest resource level, may fail where conditions are most unfavorable. As a minor example, high salaries will not attract and maintain qualified teachers if personnel policies are unacceptable (Murnane et al. 1991).

Knowledge combining educational practice, cost, outcomes, and feasibility is difficult to obtain, but greater success is possible. The main challenge is that conditions of success in a limited number of schools may be difficult to measure and replicate. For example, low cost models may flourish in schools where there are unusual leaders and teachers, and initial success may have a powerful impact over time on the quality of both staff and students. Since we cannot know what works on a broad scale until we try it, the most logical approach would seem to be a program of phased experimentation in which various programs are evaluated with various levels of resources (Clune 1994a, 1995b). It seems strange that a society so preoccupied with the importance of educational adequacy and cost should spend so little on educational experiments, which are relatively inexpensive compared to any kind of broad scale increase in resources. Perhaps we are only now reaching the point where the central questions are becoming clear.

Short of a program of organized experiments, we still could gather much better data about current interventions. This paper has already recommended that better data be obtained on the outcomes and cost of successful accelerated schools. This section adds the element of educational process, or teaching technology. We need a fine-grained understanding of what staff and students do differently in order to begin understanding the conditions under which such desirable behaviors can flourish. Careful investigations of schools adopting models of accelerated education are, therefore, a promising direction for research.

The extra costs of accelerated education

The extra costs of accelerated education are currently the subject of a wide divergence of views. A high estimate was made in *Abbott v. Burke* (119 N.J. 287; 575 A. 2d 359, 400 [1990]), the New Jersey case which ordered spending in special needs districts be set equal to resource-rich suburban districts, with an added supplement for remedial education. The New Jersey Court reasoned that a good estimate of costs of adequacy is the resources available to the state's most successful students, e.g., those with the best outcomes. An estimate of the same magnitude was derived through cost analysis by Duncombe, Ruggeriero, and Yinger (1995) resulting in at least an additional $3,800 per pupil in New York State. A low estimate was derived by Barnett who synthesized cost-effectiveness research on three programs of accelerated education and concluded that the extra costs amounted to between $100 and $1,000 per pupil per year, an amount easily covered by existing revenues (Barnett 1995). Barnett also concludes, however, there is no data on the base funding of these programs, their success rate, or the extent to which the interventions can be generalized. The most reasonable explanation of Barnett's results is the successful interventions represent the low-cost, high-skill end of a production frontier (Clune 1995b), achieved in certain schools and not in others by reformers who assume they must operate within existing levels of resources (Clune 1995b). For this reason, I did not modify my earlier guess of the full range of costs—between $2,000 and $5,000 per pupil per year. On the other hand,

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Adequacy-based funding is thought to involve three major components: base funding, student needs, and extra costs for standard inputs (Chambers and Parrish 1983).

we cannot reach any firm conclusions without more data, and there is certainly no reason to pay more than is necessary.

A large part of the problem in estimating costs is the failure to specify the various components of costs and gather appropriate data. Adequacy-based funding is thought to involve three major components: base funding, student needs, and extra costs for standard inputs (Chambers and Parrish 1983). The discussion begins with student needs, another name for accelerated education, but add the element of "slack" in the existing system. The extra costs of accelerated instruction actually consist of the total costs minus any savings which can be garnered from the typical preexisting educational program. As discussed in the previous section, the costs of accelerated education depend on the combination of inputs effective in various contexts. Professional development alone tends to be inexpensive. Extra staff, higher pay for teachers, and new levels of education such as preschool are more expensive (but also seemingly affordable).

The next question is how much "slack" is available in existing schools to pay for additional costs. Under one view, there is considerable slack, for example, in the following: high expectations and a challenging curriculum replacing low expectations for learning and dumbed-down curriculum; coordinated vs. uncoordinated learning; active time vs. down time; and efficient vs. inefficient instructional methods. These are all possible with relatively minor expenses for professional development. There is also a question about wasted administrative time. Under Levin's model, all faculty meetings are used for planning and implementing accelerated education. This seems to assume that large parts of previous faculty meetings were unnecessary. Another possible area of slack is the conversion of existing positions. One study found that extra positions could be made available by efficient management of class size (Miles 1994). Some accelerated schools appear to put more teachers in the classroom (Darling-Hammond 1995, forthcoming). Finally, accelerated schools may consolidate programs and positions aimed at meeting a variety of special needs. Slavin's schools virtually eliminate special education and retention in grade, focusing almost all remedial resources on catching up in reading, mathematics, etc. (Barnett 1995). Generally, claims of available slack are made somewhat more plausible because programs which focus on specific learning goals have incentives and standards for marshalling resources which are lacking in organizations with multiple, fragmented goals. On the other hand, the opposite view of a narrow focus is the possibility that other unmeasured goals have been sacrificed.

What is the impact of Slavin's program on the achievement of handicapped students who previously may have received more instructional resources (Levin 1994)? Teachers commonly claim that almost any strongly evaluated program with a single focus will cause them to sacrifice important parts of their teaching. For example, evaluation based on mathematics scores may overlook the importance of fine arts in a particular community. The possible distorting effects of accountability are a vexing issue, but the risk may be tolerable as long as in the aggregate and in important subgroups students perform well on a broad range of skills considered most important by society. One of the most enduring findings of education research is that programs score higher against measures of goals at which they are aimed than on generally applicable tests (Walker and Shaffarszick 1974). This finding seems better interpreted as an endorsement of organizational focus than as an assumption that all organizations must optimize some set of measured and unmeasured goals.

The assumed base level of spending is a somewhat confusing and complex issue under an adequacy-based approach calcu-

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lated in terms of incremental costs. Assuming that extra costs are $2,000 per pupil, the question is: $2,000 per pupil added to what? The normal starting place is horizontal equity, an assumed base of spending guaranteed for every district and student in the state in the form of spending per pupil or in educational vouchers. Conceptually, this base level of funding should correspond to an adequately financed program for a school which has no extra costs from expensive inputs or special needs—in effect, it is the least-cost school in the state (Duncombe, Ruggeriero, and Yinger 1995). Odden and Clune (1995b) suggest the 90th percentile of rural spending as a rough approximation of such a school, but there are alternative methods. The Alabama litigation, for example, used various official minimum standards for inputs to establish the cost of a base program (Hershkoff, Cohen, and Morgan 1995). Guaranteeing a reasonable base to high-poverty schools is much more important than the exact method of calculation. Many high poverty schools are located in resource-constrained school districts. This means that any available compensatory aid must be used to support the basic program rather than provide accelerated education.

The final component of adequacy financing is extra costs for standard inputs (Chambers and Parrish 1983). High poverty schools seem to be burdened with five types of high input costs: preschool and Kindergarten, qualified teacher salaries, building and maintenance, school safety, and social services. Early childhood education is assumed to be especially important and beneficial for disadvantaged children (Barnett 1995); and Slavin's programs guarantee some amount of this input (Madden et al. 1991). Teacher salaries must be higher in less desirable educational settings (Chambers 1981; National Education Association 1995; Reschovsky and Wiseman 1995). As for capital expenses, a common finding of the implementation of school finance reform is that poor schools frequently draw on instructional revenues to pay for deferred costs of building and maintenance (Firestone et al. 1994; Picus and Hertert 1993). School safety is widely considered an important aspect of effective schools (Purkey and Smith 1983), but less is known about how to estimate costs. Social services are the most confusing of the categories because they are potentially important in the case of poor children and may be organized separately (despite the movement toward collaboration and school-linked services, and are financed by different budgets [Kirst 1994; Zigler and Stevenson 1994]).

One of the most confusing issues in adequacy-based funding is how to measure and do research on these various categories of costs. Cost analysis attempts to reflect the broadest range of costs, including teacher salaries. However, the sample used may not be representative of the most needy schools, and capital expenditures usually are not included (Clune 1995b; Duncombe, Ruggeriero, and Yinger 1995). At the other extreme, cost-effectiveness analysis of accelerated programs often does not take into account either the base program or costly inputs. These are both large categories relative to extra instructional spending designed to meet student needs. It would, therefore, be helpful if future research could begin to triangulate cost estimates drawn from different assumptions and included different components of cost. Studies of accelerated schools could gather better data on base funding and input costs in addition to the marginal cost of meeting student needs. Cost analysis might focus on high-poverty schools and include capital spending. Research on labor markets for teachers might attempt to calibrate costs relative to qualifications shown by research to be important to the achievement of disadvantaged students. Capital costs may benefit from a separate analysis based on rational standards of a physical plant which is minimally acceptable for adequate instruction of the type required

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The basic flaws of existing educational [adequacy] funding formulas...are... failure to provide either guaranteed base funding or fully cover extra costs of inputs and special needs

for accelerated education. Such analysis of capital costs should take into consideration any backlog of needs and the effects of changes in student population (e.g., rapid growth).

The structure of state aid under an adequacy theory

The basic flaws of existing educational funding formulas, from the perspective of educational adequacy, are quite simple and twofold: failure to provide either guaranteed base funding or fully cover extra costs of inputs and special needs. At a deeper level, these flaws are caused by starkly different assumptions of adequacy and equity approaches to state aid (Reschovsky and Wiseman 1995). Most state aid formulas are built around inter-district equity, spend more money on horizontal equity than special needs or extra costs, and include a generous element of local taxing discretion. These formulas may or may not be supported by a fair system of matching grants from the state (guaranteed tax base). Previously, I have recommended that the special needs part of the formula be fully funded and put on top of a strong statewide system of horizontal equity. For example, one might think of a foundation level at the 90th percentile of rural spending, a guaranteed tax base above that level, categorical aid for instructional needs, and special adjustments for extra costs (Clune 1995a, forthcoming).

Such an approach of supplemented equity would certainly represent an improvement for many high poverty schools (see American Institutes for Research 1993: how the lowest levels of compensatory aid under Chapter 1 often went to the poorest districts). However, there remain some serious problems. The generous guarantee of horizontal equity in the form of the high foundation program causes competition for scarce funds between horizontal equity and special needs. Local taxing discretion is likely to result in inadequately addressing the special needs of some of the state's neediest students. An alternative is to forthrightly recognize the different assumptions of the two systems and design a separate system of finance for high poverty schools (similar to what the court attempted in New Jersey but with more refined estimates). High-poverty schools could receive a high foundation grant, special categorical aid, and supplements for extra costs, all guaranteed by the state under a reasonable system of sharing state and local taxes. Such a distinct and severable approach to the funding of high poverty schools probably also represents a better fit with the special problems. These problems of governance and accountability, discussed below, arise from the attempt to create better incentives for actually adopting some form of accelerated education.

What kind of research is possible on school aid formulas? The most fruitful approach appears to be a set of simulations based on different assumptions of the costs of adequacy and the structure of state aid. The basic questions are the same for every study of school finance: total revenue, tax burden, and distributional consequences (how much would it cost, to which taxpayers, and how many schools would experience an increase or decrease in spending). While many simulations have been done of school aid formulas (Odden and Picus 1992), a different view would be produced by a rigorous analysis focused on the special needs of poor children. The question would be one of "opportunity cost" (Chambers and Parrish 1983)—what are the revenue and distributional consequences of full funding of adequate education while meeting the other needs in a cost-minimizing fashion. Of course, the normal assumption is exactly the opposite—meeting various competing needs and determining what is left over for the poor; and this tends to hold true even in the context of litigation aimed primarily at compensatory education (Goertz 1983). In such studies, it would be difficult to ignore the problem often discussed in school finance

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of inter-state differences in spending. Alabama clearly has lower costs than New York, but such costs are not proportionate to the full difference in wealth and spending. A suitable national policy on adequate funding (what Chapter 1 purports to be) would need to take into consideration inter-state differences in the level of base funding. Therefore, research on adequacy funding should include simulations of the effects of inter-state adjustments.

Implementation—increasing the number of schools using cost-effective accelerated education

Suppose, then, we understand what accelerated education is, how much it will cost, and how funding is obtained. How does the policy system guarantee, or increase the odds, that the schools receiving the funds actually will adopt and successfully implement a version of accelerated education? Whatever the educational technology and cost, accelerated education involves adopting a set of new attitudes, teaching skills, and management practices. On one level, the greatest puzzle about accelerated education is why it is adopted by so few schools. Does the barrier to wider implementation consist of motivation or capacity, or both? A serious debate about this exists, somewhat paralleling the debate over costs. At one end of the spectrum, the transfer is seen as relatively easy, and can be implemented on a wide scale by a combination of state accountability, incentives, and professional development (Hanushek 1994). An intermediate position on implementation difficulty is that schools will need to join accelerated schools' networks and receive the intensive, targeted training available through those networks (Clune 1987; Slavin, Madden, and Dolan 1994). A third view is that we have barely touched the problem of implementation, because existing successful schools are probably connoisseurs of improvement (Elmore 1995, forthcoming). Most schools, under this view, present serious problems of inertia and resistance to wholesale improvement. These are problems which are presently little understood, either in their dimensions or remedies.

Lack of data is one problem in answering the questions about implementation. Implementation of accelerated education is even less studied than evaluation of costs and outcomes. The establishment and survival of demonstrations and experiments is an understood part of published literature. Little thought is directed to the problematic nature of how such innovations are disseminated, adopted, and transferred. More studies of propagation, adoption, and training within accelerated school networks are needed. Schools which successfully adopt a change should be compared with those where the effort fails. Another important comparison is that of schools under strong pressure and incentives to improve from state and local accountability systems (as opposed to networks). Is improvement largely random under the different systems? Is there a residue of schools resistant to any stimulus, and what is known about how to reform such schools? For example, how does the remedy of closing failing schools work?

Lack of data is one problem in answering the questions about implementation. ...More studies of propagation, adoption, and training within accelerated school networks are needed.

Implementation also involves some costs beyond professional training in the target school. Member schools of the Success for All network have been providing a trained teacher/manager to other schools for a year, free of charge. To the extent that propagation does involve a subsidy, it is necessary to understand the best method of financing this cost for the future.

Governance—the blend of accountability variety and decentralization necessary for adequate education

Whatever the proper stimulus for reform, a question arises about the range of governance structures capable of tolerating and

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The question, then, is what kind of sensitive governance structure is capable of exerting strong pressure without stifling schools or pushing them in the wrong direction.

encouraging such reforms. Consideration of this range of structures will again result in serious debate. In one sense, the problem is the familiar tension between top-down and bottom-up reform. Research on implementation will probably clarify that not much will happen without a stimulus to change. It seems equally clear, however, that there are at least several kinds of accelerated education, each requiring a high degree of adaptation and flexibility. The question, then, is what kind of sensitive governance structure is capable of exerting strong pressure without stifling schools or pushing them in the wrong direction.

Some authorities seem to believe that accelerated education can occur under most kinds of governance systems. It can be viewed as traditional education done more effectively and efficiently and, therefore, presents no problem for management or unions (this is my impression from talking with Henry Levin). I took the position earlier that strong instructional guidance from central government was an unlikely match (Clune 1987), but arguments for the power of coherent policy have not been proven wrong (Smith and O'Day 1991). The power of simple incentive systems, such as rewards for outcomes or participation in networks, deserve consideration because of their relatively non-intrusive character (Hanushek 1994). Some people regard school districts, especially large urban districts, as a serious obstacle (Darling-Hammond 1995, forthcoming) while others think the relationship varies according to local context (Carnoy et al. 1994). Under one view, many large districts are the enemies of school improvement, not only stifling them with unnecessary regulations, but regarding their success as a threat. This view probably favors the largest possible amount of site management but, additionally, does not explain the source of pressure and incentives to encourage schools to change. If it is necessary that the schools join a network, what agency will certify the network: what are the incentives; and how shall good faith participation be evaluated? In an earlier article, I suggested that networks perform technical assistance and provide simple data for evaluation, leaving only ultimate evaluation to a government agency (Clune 1987). On the basis of empirical evidence, some researchers are skeptical about the capacity of any government agency to assess when intervention is required and to intervene in an appropriate manner (Firestone and Nagle 1995; Hess 1994). The deregulation and community of purpose attributed to radical decentralization, e.g., choice and charters, have been recommended as possible sources of school improvement, or at least of freedom from burdensome regulations; and these claims should be seriously evaluated.

The research which seems most appropriate to these questions would be studies of rapidly improving and other schools in both network and incentive systems under various conditions of guidance, restriction, and assistance from central government.

Choice and decentralization—the reality of a low cost, low change alternative

In a political sense, choice and decentralization seem to have a quicker start than sustained school improvement, perhaps because they are easier do. Despite earlier claims (Chubb 1990; Chubb and Moe 1990), the evidence that decentralization will produce major changes in achievement seems weak, both empirically and theoretically (Clune 1990; Hoxby 1995; Witte et al. 1994). Indeed, the rationale of choice advocates may be changing from instrumental arguments about effectiveness to value arguments about freedom of choice and association. But choice does offer at least one important option in the debate over adequacy: the possibility of a low cost, low change alternative. The Milwaukee experiment did not increase scores, but it did not decrease them either, and the voucher

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schools cost much less than the public schools. Again, the generalization of modest cost is subject to vehement debate. Initially, low cost seems based on excess capacity in a limited number of existing private schools and a secondary labor market for teachers. It is doubtful that drastic reductions in teacher qualifications resulting from massive cuts in teacher salaries are politically feasible, or will have a beneficial impact on student achievement.

Nevertheless, these are all empirical questions, and the political appeal of choice makes it well worth watching. From the perspective of adequacy, we need to understand effect of large scale decentralization change on education for poor children. A reasonable set of questions would include the effects on: private investment; public investment; costs (including transportation and regulation, [Levin 1990]); the labor market for teachers; student achievement; and stratification of students by race, class and achievement. One problem for such research is finding large scale demonstrations in the United States. Choice systems in this country tend to be small and incremental. Comparative studies involving many students, such as those conducted in Europe and South America, may be useful, especially with regard to some basic dynamics of student achievement, markets and public finance (Carnoy 1995).

A crosscutting look at the research questions and methodologies appropriate for studying educational adequacy

This section summarizes research questions discussed in this paper and comments on methodologies appropriate for answering them.

1. **Definition of educational adequacy and the political problem of available resources**

- degree of conformity among minimum standards of achievement in the United States
- existing funding levels for poor students and the extent of the funding gap

2. **Demographics of educational need**

- distribution of low educational outcomes in the U.S. and degree of correlation with high-poverty schools
- overlap and divergence of various categories of special needs: poor, handicapped, bilingual

3. **Feasibility of raising educational outcomes**

- studies of data on poor children
- longitudinal outcome data from accelerated schools

4. **Geographic mobility and irregular attendance**

- studies of the extent and kind of mobility in high poverty schools and its impact on student achievement

5. **Educational technologies of accelerated education**

- organized experiments of accelerated education involving different program approaches and costs
- studies of the teaching technologies of existing accelerated schools

Comparative studies involving many students, such as those conducted in Europe and South America, may be useful, especially with regard to some basic dynamics of student achievement, markets and public finance (Carnoy 1995).

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The problems for fashioning a true national agenda involve supporting and coordinating a more extensive and cohesive set of related studies.

6. **Extra costs of accelerated education**

- parallel cost estimates from accelerated schools and quantitative analysis
- separate estimates of capital cost needs
- studies of the costs of qualified teachers in the labor market

7. **Structure of state aid under an adequacy theory**

- simulations of two different aid formulas under different cost assumptions

8. **Implementation—increasing the number of schools using cost-effective accelerated education**

- studies of attempts to implement new accelerated schools
- studies of school transformations under various incentive systems
- studies of the costs of school improvement networks

9. **Governance—the blend of accountability variety and decentralization necessary for adequate education**

- studies of role of governance in rapidly improving and other schools under different kinds and degrees of educational governance (including decentralization)

10. **Educational decentralization as a low cost alternative**

- studies of investment, cost and educational outcomes especially in large scale choice experiments

Several of generalizations can be made about the research methods appropriate to these questions. First, much of the agenda depends on gathering more data from existing accelerated schools. Accelerated education is not very common in U.S. education, so it is not surprising that the some of the most valuable data would come from demonstration sites. At the low end of the scale of research burden, it would be very helpful to have basic data on educational outcomes and costs. At a higher level of burden, we would like a much better understanding of teaching technology, implementation, and fine-grained aspects of costs. But obtaining systematic data from accelerated schools presents a problem. The schools have their own systems of evaluation and may not agree with externally developed standards. Data gathering is also intrusive and expensive. This suggests a rather intense need for some kind of cooperative agreement and, if possible, extra financing for research.

A second category of research involves a variety of potentially useful secondary data sources—the demographics of student need, achievement trends among the poor, geographical mobility, simulations of funding formulas, and the like. Some research has been done in all of these areas and will continue to be done. The problems for fashioning a true national agenda involve supporting and coordinating a more extensive and cohesive set of related studies. Such an effort might normally be organized by the government or a foundation; but some real progress might be possible through the voluntary cooperation of research scholars and interested government agencies, such as big city school districts.

A third category of research involves a study of change in schools operating under different systems of incentives and governance. This kind of research seems best suited to a large scale, longitudinal research project, such as a research center.

The fourth category of research involves implementation of large systems of educational choice. Such research also may need substantial funding but may occur in selected locations without any special effort because such systems are rarely implemented and are the subject of great scholarly and political interest. Input from the adequacy community into the design of the research might be valuable.

Conclusion: The cumulative effect of better information

The basic thesis of this paper has been that a comprehensive research effort can help establish the legitimacy of a program of educational adequacy and define its contours. Much fragmented research has been done on all of the research topics discussed. It is hoped that an orderly exposition of the full range of topics will generate enthusiasm for an effort which has a higher level of support and better coordination.

...a comprehensive research effort can help establish the legitimacy of a program of educational adequacy...

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